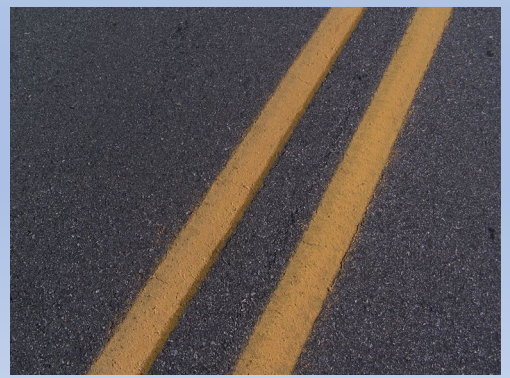
Pavement Markings used in NC

- **Paint**
- **Thermoplastic**
- **Polyurea**
- **Cold Applied Plastic (Thermoplastic product with adhesive backing, multiple grades). Made in factory and applied to the pavement**
- **Work Zone Performance Special Provision allows use of “medium” life markings instead of paint. Examples are high build paint, polymers, thinner thermoplastic and polyurea**
- **Surface preparation is the key to any pavement marking**

Paint



Thermoplastic



Polyurea



CAP



Except for black pavement markings, all NC pavement markings should be retroreflective



NC Standard Glass Bead



AASHTO Type 4 Glass Bead

Pre-marking and Layout for Pavement Marking







Checked and approved?

Were these checked, approved, and inspected?







Paint

- **Temporary Pavement Marking For Work Zones**
- **Projects that will be resurfaced in the next year**
- **Short Term**
- **Maintenance**
- **Pre-marking**
- **Interim Paint**



Characteristics of Paint

- Sprayed pavement marking that lasts approximately 3 months to 2 years depending on average daily traffic (ADT) and snowplowing
- Lasted about 2 months on Fortify
- Normal curing times for no track is 1-2 minutes
- Can be applied on asphalt or concrete pavement
- Initial retroreflectivity requirements:

    225 White

    200 Yellow

Paint on the NCDOT Approved Products List

- We do not evaluate paint as a permanent marking
- Traffic Paint used on NCDOT roads must meet Federal Specification No. TT-P-1952F

- Unless installed as an interim marking, must be installed in two separate coats at a minimum 15 mils each with glass beads on each coat

Paint Application

- Truck applied application equipment must have at least two paint tanks and a glass bead tank.
- Paint tanks should be 60 gallons or more
- Glass bead tank(s) should be 500 lbs or more





Paint Examples

- Good paint vs Bad paint





Thermoplastic

- Long life pavement marking material that lasts for 5-7 years in non-snowplowed areas
- Can be used on any asphalt roadway. If used on concrete, sealer is required
- Normal curing time between 3 and 10 minutes
- Applied at 90 mils, must have intermixed beads and drop on beads
- Initial retroreflectivity requirements:

  375 White

  250 Yellow



Thermoplastic Symbols and Characters

- Applied with a hand cart
- Requires retroreflective material
- Normal curing time between 3 and 10 minutes
- 90 to 120 mils based on manufacturer
- No more than 1000’ feet of continuous line can be applied with a hand cart

- Initial retroreflectivity requirements:
  - 375 White
  - 250 Yellow



Thermoplastic Placement Time Restrictions

(B) Weather Limitations and Seasonal Limitations

Do not apply thermoplastic pavement markings on existing or new pavements unless the ambient air temperature and the temperature of the pavement is 50°F or higher.

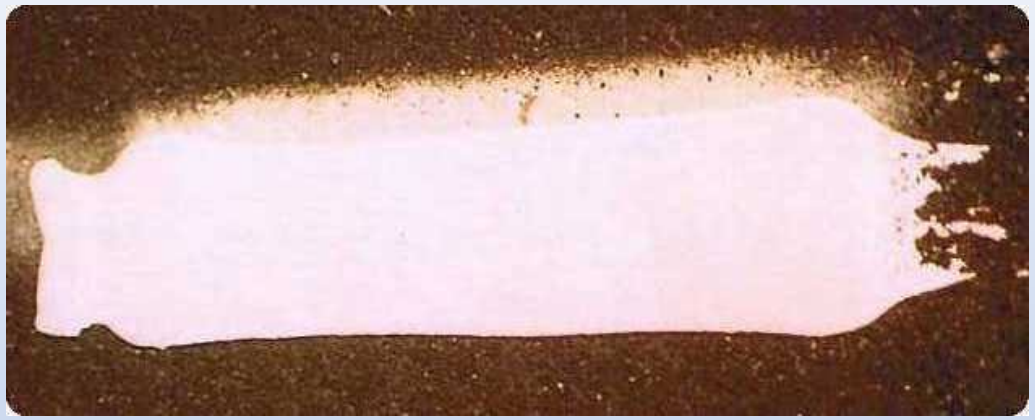
Do not apply thermoplastic pavement markings between the dates specified below:

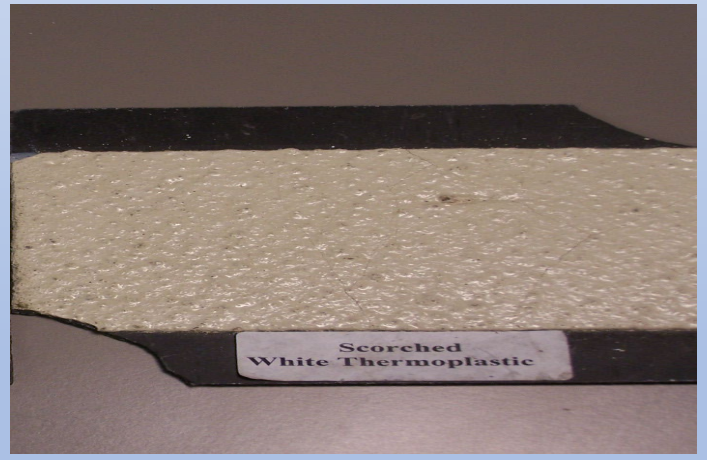
East of I-95	December 15 and the following March 16
East of I-77 to and including I-95	November 30 and the following April 1
West of and including I-77	November 15 and the following April 16

Exception to the above: When traffic is maintained on a portion of roadway and thermoplastic pavement marking will not be placed within 30 calendar days due to seasonal limitations, place pavement marking paint and beads in accordance with Subarticle 1205-8(C).

Thermoplastic Examples









Polyurea

- Long life sprayed pavement marking material that lasts for 5-7 years.
- Can be used on asphalt and concrete roadways
- Normal curing time between 5 and 10 minutes
- Applied at 20 to 30 mils depending on type of pavement
- NCDOT is going back to only using drop on standard beads
- Initial retroreflectivity requirements with standard beads:

  375 White

  250 Yellow

Polyurea Characteristics

- Two-part system that is a variation of epoxy
- NCDOT used epoxy in the past but had color retention issues
- Designed to cure very hard so that it is durable when hit by tires or snowplows
- Wait a minimum of 15 days before placing on new asphalt





Polyurea Examples







Cold Applied Plastic – “Tape”

- Manufactured thermoplastic product with and adhesive back that is applied to pavement.
- Four types in NC
- Very durable product but cost prohibitive
- Can be applied to asphalt or concrete with proper preparation



Cold Applied Plastic Retroreflectivity

TABLE 1205-5
REFLECTOMETER REQUIREMENTS FOR COLD APPLIED PLASTIC TAPE

Type	Color	Reflectivity
Type 1 - Permanent Standard Tape	White	400 mcd/lux/m^2
	Yellow	300 mcd/lux/m^2
Type 2 - Permanent High Performance Tape	White	500 mcd/lux/m^2
	Yellow	300 mcd/lux/m^2
Type 3 - Permanent Wet Reflective High Performance Tape (Wet)	White	250 mcd/lux/m^2
	Yellow	200 mcd/lux/m^2
Type 3 - Permanent Wet Reflective High Performance Tape (Dry)	White	500 mcd/lux/m^2
	Yellow	300 mcd/lux/m^2
Type 4 - Removable Tape	White	700 mcd/lux/m^2
	Yellow	400 mcd/lux/m^2

Type 1 is typically a 2 year life cycle permanent tape used on roadways with an ADT of 5,000 or less.

Type 2 material may come as one piece with a black border with yellow or white in the center. Type 2 is typically a 5 year permanent tape used on roadways with an ADT greater than 5,000.

Type 3 wet reflective tape shall meet Table 1205-5 retroreflective values, both wet and dry. The value measured under wet conditions shall be measured in accordance with

Cold Applied Plastic Examples



Contrast CAP



“Old” CAP



Wet Reflective CAP

Work Zone Performance Markings

- The Work Zone Performance pavement markings shall be manufactured to bond successfully to both concrete and asphalt pavements. The following are approved materials to be used for Work Zone Performance pavement markings:
- Polyurea
- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic (Type IV)

- Material Qualifications/Certifications
- Use Work Zone Performance pavement marking materials, as listed above, which are on the NCDOT Approved Products List at the time of installation.
- In accordance with Article 106-3, and Section 1087-4 of the 2018 NCDOT Standard Specifications for Roads and Structures, provide a Type 3 Material Certification for all materials and a Type 3 and Type 4 certification for all reflective media.

Work Zone Performance Markings

- The Work Zone Performance pavement marking material shall be applied at the following minimum thicknesses:

- Polyurea - 20 mils wet
- Epoxy - 20 mils wet
- Thermoplastic - 50 mils (Extruded or Sprayed)
- Polymer - 20 mils wet
- Cold Applied Plastic (IV) - Manufacturer’s recommendation

Questions?

Matt Springer – NCDOT – 919-819-3148