TACK COAT

BEST PRACTICES FIELD GUIDE 2012

ASPHALT TACK COAT

What is tack coat?

Tack coat is liquid asphalt or asphalt emulsion that is sprayed on pavement to promote bonding, acting as glue between the existing surface and the new asphalt layer.

When is tack coat required?

Tack coat must be applied beneath each layer of asphalt plant mix to be placed.

There are four essential requirements for a successful tack coat application:

1) Existing pavement surface must be dry and thoroughly cleaned.
2) Proper tack coat rate must be applied.
3) A uniform coverage of tack must be placed over the entire area to be paved.
4) Tack coat must break prior to trucks backing over the tack or placing a new asphalt layer.

TACK COAT GRADES

Unless approved by the State Asphalt Design Engineer, all tack coat materials will be either an asphalt binder **Grade PG64-22** or an asphalt emulsion with one of the following grades:

Grade RS-1H

Grade CRS-1

Grade CRS-1H

Grade HFMS-1

Grade CRS-2

NOTE: Asphalt emulsions shall not be diluted with water.

NOTE: Different grades (or manufacturers) should not be mixed in a storage tank, a tanker, or a distributor.

All tack coat materials shall meet the Standard Specification requirements in Sections 1020-2 and 1020-3.

EXISTING SURFACE PREPARATION

What to look for?

Existing surface must be thoroughly clean and dry. The existing surface also should be:

- Swept with a mechanical broom to ensure surface is free of dust and foreign material
- At an atmospheric temperature of 35 degrees Fahrenheit or higher

Refer to Section 605-3 and 605-4 of the Standard Specifications.

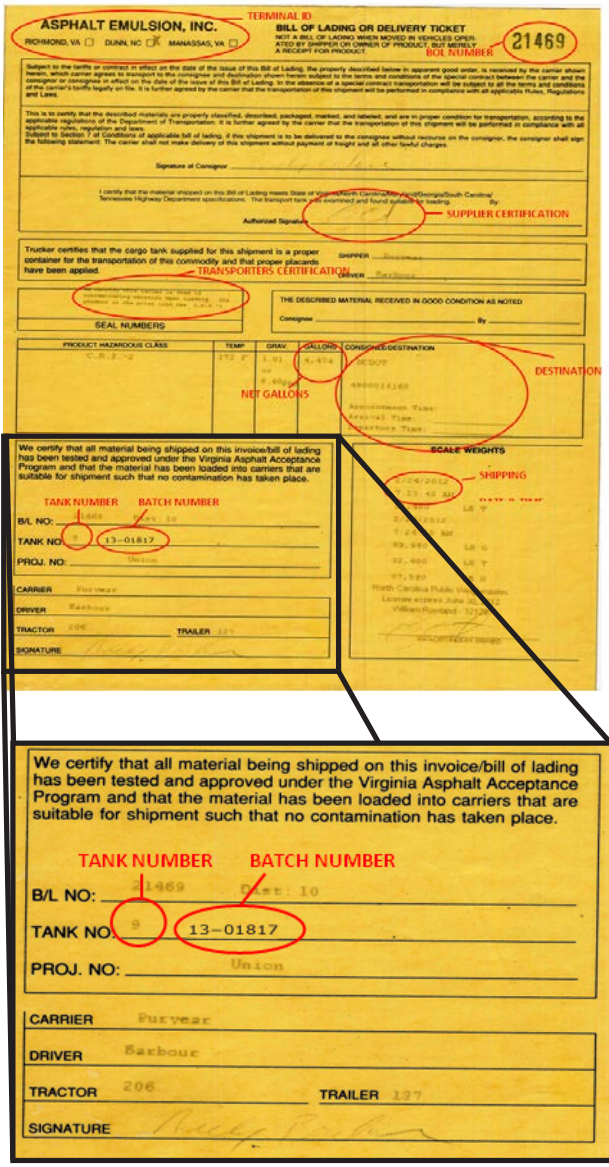
RECEIVING ASPHALT EMULSION

Process:

1) Verify source of tack coat on bill of lading (BOL) as coming from terminal on approved NCDOT list.
2) Verify that BOL contains NCDOT assigned batch numbers. The first two numbers are the Approved Asphalt Terminal (AT) number.
3) Obtain a copy of the BOL for every shipment and include it with the materials received report (MRR) for each project. Note that in most cases, one BOL may represent several distributor truck loads, since many contractors have tankers shipped to central locations and fill distributor trucks from the tanker.
4) BOLs may be obtained from the contractor's project personnel on site or may be sent from plant personnel managing the tack shipment directly to the Resident Engineer's office. Arrangements for obtaining the BOL should be discussed prior to beginning work.
5) Confirm that all approved suppliers have an asphalt terminal (AT) number.
6) Confirm that BOL has supplier and transporters certifications recorded.
7) Create a record of net gallons delivered to the project.
8) Confirm that approved grade of material is recorded on BOL.
9) If BOL is lacking any required information, decline to accept the tack on the project until BOL is corrected.
10) For more detailed information refer to Materials & Tests Unit's "Asphalt Emulsion Receiving Guide" at the following website: **https://connect.ncdot.gov/resources/Materials/MaterialsResources/Asphalt%20Emulsion%20Receiving%20Guide.pdf**

SAMPLE BILL OF LADING (BOL)

SAMPLE BOL - ASPHALT EMULSIONS – DUNN, NC – AT 13



We certify that all material being shipped on this invoice/bill of lading has been tested and approved under the Virginia Asphalt Acceptance Program and that the material has been loaded into carriers that are suitable for shipment such that no contamination has taken place.

TANK NUMBER BATCH NUMBER

B/L NO: 21469 Dust 10

TANK NO: 9 13-01817

PROJ. NO: Union

CARRIER Puryear

DRIVER Barbour

TRACTOR 206 TRAILER 127

SIGNATURE

REQUIREMENTS ON BOL

Referenced in Section 1020-1 of Standard Specifications

A) Name and location of supplier

B) Material meets AASHTO or ASC standards

C) Grade of material

D) Rotational viscosity (if applicable)

E) Lab mixing and compaction temperatures (if applicable)

F) BOL number

G) Date and time loaded

H) Date and time shipped

I) NCDOT Assigned Batch Number

J) Destination

K) Name of consignee

L) Trailer or car number

M) Supplier's storage tank and batch number

N) Quantity (tons or gallons) at 60 degrees Fahrenheit

O) Loading temperature

P) Net gallons at 60 degrees Farenheit

TACK COAT APPLICATION RATES

Application rates shall be based on the following chart for the existing surfaces on which tack coat is applied:

Existing Surface	Target Rate (gal/sy)
New asphalt	**0.04** (+/- 0.01)
Oxidized or Milled	**0.06** (+/- 0.01)
Concrete	**0.08** (+/- 0.01)

NOTES: The plus or minus 0.01 in the rate is provided for equipment variability.

Target rate of 0.06 for oxidized surface is to be used for any re-surfacing projects.

TACK COAT APPLICATION TEMPERATURES

Asphalt Material	Temperature Range
PG 64-22	350 – 400 F
Grade RS–1H	130 – 160 F
Grade CRS–1	130 – 160 F
Grade CRS–1H	130 – 160 F
Grade HFMS–1	130 – 160 F
Grade CRS–2	130 – 160 F

NOTE: Tack coat shall not be overheated. Temperatures over 180 degrees can make the asphalt material unstable and begin to "break in the tank."

METHODS TO MEASURE TACK

Method 1) Perfom Calculation

Check flow meter on distributor truck and record number of gallons registered on the meter before and after application to determine the number of gallons used.

Formula to calculate target tack quantity in gallons:

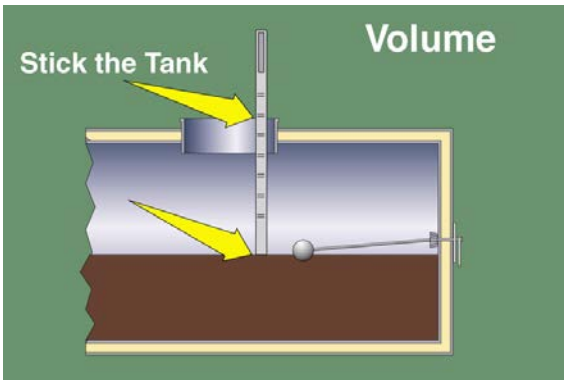
Gallons = (Width of roadway * Length * Rate) / 9

Example: Gallons = (12 ft * 2640 ft * .06 gal/sy) / 9 sf = 1900.8 /9 = 211.2 gallons)

Method 2) "Stick the tank"

Each tank has a calibrated measuring rod by manufacturing company. Use this measuring gauge on top of distributor truck to check number of gallons prior to placement.

After tack is placed on roadway, re-check gauge for number of gallons remaining and subtract for total gallons placed.



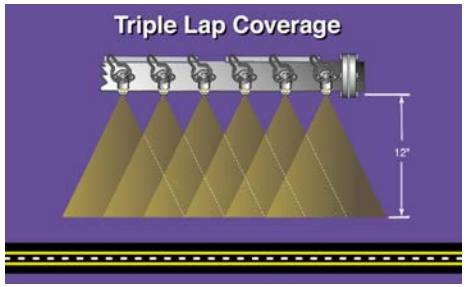
Method 2 is recommended by the manufacturer at least once a year. However, use Method 2 anytime there are questions with Method 1. Only attempt with assistance from the distributor operator.

CHECK DISTRIBUTOR TRUCK

Equipment must be calibrated and in proper working condition. Refer to Section 600-5 of the Standard Specifications.

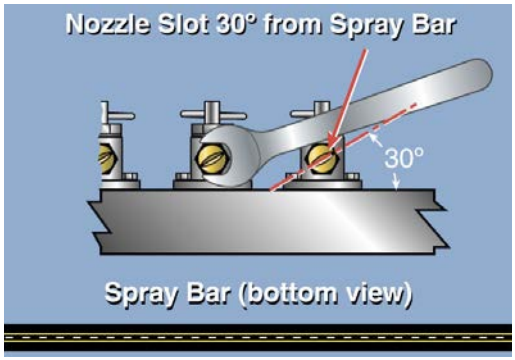
Temperature Gauge: Check application temp.

Spray Bar Height: Recommended height is 11 to 12 inches from surface and application at triple lap coverage.



CHECK DISTRIBUTOR TRUCK

Nozzle: Use a tack nozzle set 30 degrees from spray bar to allow stream to pass by the adjacent nozzle stream.



Application Rate Gauge: Check inside truck for reading to confirm target rate set by operator.

Tank Gauge: Read on back of truck to check quantity.

UNIFORM TACK COAT APPLICATION

What to look for?

Existing surface must be completely and uniformly covered with tack coat.

- Avoid “corn rows” or streaks in coverage
- Avoid spots with excessive tack

Refer to Section 605-6 in NCDOT Standard Specifications.

NON-UNIFORM TACK COAT APPLICATION

Action items:

1) Check distributor equipment.
2) Check spray bar height.
3) Check application temperature.
4) Check rate for existing surface.

Recommendations to Contractor:

1) Repair or replace equipment (i.e. nozzles) when uniform application is not provided.
2) In most cases, recommend a spray bar height of around 12".
3) Insure application temperature is within specification range and verify from gauge located on distributor truck.
4) Use tack coat rate using guidelines based on existing surface conditions.

ENSURE TACK "BREAKS"

Tack coat will turn from a **brown** color after placement on the surface to a **black** color after it breaks.

The water in the tack is evaporating and leaving just the asphalt tack to remain.

Make sure the tack "breaks" prior to trucks backing over the tack or prior to paving a new asphalt layer.

TACK COAT PROBLEMS

When tack coat is not properly applied, roadway slippage and delamination of overlay from underlying pavement may occur.

NON-TRACKING TACK COAT

Non-tracking tack coat is a form of tack coat with formulations so that it does not track after it is placed. Contractor is allowed to use non-tracking tack coat as an option.

Materials & Tests Unit has an approved list of non-tracking tack coat products at the following website:

https://connect.ncdot.gov/resources/Materials/MaterialsResources/Approved%20Non-Tracking%20Tack%20Coat%20Products%20for%20NC.pdf

Contractor must provide notification to Engineer on project prior to using this type of tack.

Application rates for non-tracking tack coat shall be the same target rates as for regular asphalt tack.

Application temperatures should be based on the manufacturer's recommendations.

Contractor shall use special operations when using this type of product. If public traffic is maintained, cover tack in same day's operation or provide continual lane closure until tack is covered. The application of granular material will not be allowed. If extended lane closures are required, then applicable liquidated damages will apply. Engineer may limit application of tack in advance of the paving operation.

NOTES

NOTES

N.C. Department of Transportation
Construction Unit
1543 Mail Service Center
Raleigh, NC 27699-1543
919-707-2400

https://connect.ncdot.gov/projects/construction/Documents/Tack%20Coat%20Best%20Practices%20Field%20Guide%202012.pdf

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