STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

MEMO

November 8, 2024

Dear Interested Vendor:

North Carolina Department of Transportation (NCDOT) has developed a testing program for asphalt solvent products. This testing program will enable NCDOT to create and maintain a Qualified Products List (QPL) for these materials. NCDOT plans to issue an Agency contract for the purchase of asphalt solvent once the QPL has been established. Only vendors with "qualified" asphalt solvents will have the opportunity to bid on the contract.

Attached is an explanation of the Asphalt Solvent Testing Program. This year product samples may be submitted for testing between November 4, 2024, and December 6, 2024. No product samples will be accepted after 4:30 PM on December 6, 2024. The opportunity for testing and addition to the QPL will only occur one time this year and will not occur again until the statewide contract resulting from this round of testing is set to expire.

Carefully review the section entitled "Submitting a Product for Testing" of the program explanation. There are specific requirements for how a sample must be submitted. Any product sample not meeting these requirements will be returned to the vendor.

Please direct any general questions regarding the overall program to Massiel Perez (mperez6@ncdot.gov). Questions specific to the testing process can be directed to Chip Lichtenwalner (rllichtenwalner@ncdot.gov

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NC Department of Transportation Asphalt Solvent Testing Program

One of the primary goals of NCDOT is to protect the state's natural resources and promote environmental stewardship. Numerous companies have developed a variety of solvent products using citrus, pine, and/or soy extracts purported to remove asphalt from tools and equipment used in patching and paving operations. This testing program is intended to evaluate submitted products for compliance with NCDOT's specification for asphalt solvents and to evaluate the effectiveness of the product in removing asphalt. This testing program is also designed to verify that NCDOT purchases a cost effective product.

Asphalt Solvent Specification

Materials used as asphalt solvents or degreasers shall have a solvent effect on asphalt materials and shall be capable of readily removing asphalt. They shall not contain per- and polyfluoroalkyl substances (PFAS), chlorinated solvents, caustics, acids, or any other constituents harmful to the environment as listed in the United States Environmental Protection Agency (USEPA) 8260B test method. The material shall be inherently biodegradable and shall not be considered a hazardous material. A Safety Data Sheet (SDS) shall be furnished when the material is submitted for approval and shall accompany all shipments. The asphalt solvent shall meet the criteria established below, with final acceptance being performance based.

SPECIFICATION:	AGENT, ASPHALT SOLVENT
NCDOT NUMBER:	01-02566
TECHNICAL REQUIREMENTS	
FORM:	LIQUID
ODOR:	NOT OFFENSIVE
COLOR:	N/A
FLASH POINT:	greater than 140° F (60 ° C) *(As defined by 40 CFR 261.21 and 49 CFR 173.120)*
FOAM:	NON-FOAMING
DETERGENCY:	NON-IONIC
PHOSPHATES:	NONE
FREE ACIDS:	NONE
BIODEGRADABILITY:	DEGRADABLE
CONTAINERS:	BIODEGRADABLE, EXCHANGEABLE OR RECYCLABLE
PACKAGING:	7, 20 OR 55-GALLON CONTAINERS
pH:	5.0 – 9.0

Testing the Solvent for Compliance to the Specification

To evaluate compliance with the material specification, the solvent product will be analyzed using six different tests. All six tests will be run in triplicate. For the Environmental Screening Test, the Performance Test, the pH Measurement, and the PFAS test, the product must meet the specification for at least two of the three replicates. **Any product failing two or more of the three replicates will be disqualified and will not be considered for the QPL.**

1. **Flash Point Test -** ASTM D-93 (Pensky-Martens Closed Cup)

   This test will verify the closed cup flash point of the product to determine if the solvent is classified as a hazardous material according to 49 CFR 173.120 and 40 CFR 261.21.

   The flash point result will be the average of the three flash points determined. A product must have an average flash point greater than 140° F (60°C) to pass this test.

2. **Environmental Screening Test -** EPA Method 8260B

   This test will verify the product does not contain any environmentally harmful constituents such as chlorinated solvents and other known problematic substances. A product must **not** contain any amount of substances listed under this method in order to pass this test.

3. **Performance Test**
   Test developed by Dr. Akhtarhusein A. Tayebali, PE at NC State University through the NCDOT Technical Assistance Program (see "Performance Test Method" below).

   This test will evaluate the effectiveness of the solvent product to remove bituminous materials as required in the specification. The product must remove an equal or greater amount of asphalt than is removed by the diesel standard.

4. **pH Measurement -** EPA Method SM 4500

   This test will verify that the product pH is within the required 5.0-9.0 range. The solvent product must conform to the specification requirement to pass this test.

5. **Per- and Polyfluoroalkyl Substances (PFAS) Screening Test**
   DoD QSM Table B-15 Isotope Dilution Method.

   This test will verify the product does not contain any PFAS listed in the table on the following page.

6. **FT-IR Fingerprinting -** NCDOT Internal Test Method

   This test will be used to generate a baseline of the composition of the product to compare to future quality checks to ensure product formulation is consistent through the duration of the contract.

PFAS Compound	CAS #
Perfluoro(2-ethoxyethane)sulphonic acid (PFEESA)	113507-82-7
Fluorotelomer sulfonate 10:2 (10:2 FTS)	120226-60-0
PMPA	13140-29-9
Hexafluoropropylene Oxide Dimer Acid (HFPOA-DA/Gen X)	13252-13-6(b)
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (N-EtFOSE)	1691-99-2
Perfluorooctanesulfonate (PFOS)	1763-23-1
Perfluoroundecanoic acid (PFUdA)	2058-94-8
N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	2355-31-9
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE)	24448-09-7
Perfluoropentanoic acid (PFPeA)	2706-90-3
Perfluoropentanesulfonate (PFPeS)	2706-91-4
Fluorotelomer sulfonate 6:2 (6:2 FTS)	27619-97-2
Perfluorodecanesulfonate (PFDS)	2806-15-7
Nafion Byproduct 1	29311-67-9
N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	2991-50-6
Perfluorohexanoic acid (PFHxA)	307-24-4
Perfluorododecanoic acid (PFDoA)	307-55-1
N-methylperfluoro-1-octanesulfonamide (N-MeFOSA)	31506-32-8
Perfluorooctanoic acid (PFOA)	335-67-1
Perfluorodecanoic acid (PFDA)	335-76-2
Perfluorohexanesulfonate (PFHxS)	355-46-4
Perfluorobutyric acid (PFBA)	375-22-4
Perfluorobutanesulfonate (PFBS)	375-73-5
Perfluoroheptanoic acid (PFHpA)	375-85-9
Perfluoroheptanesulfonate (PFHpS)	375-92-8
Perfluorononanoic acid (PFNA)	375-95-1
Perfluorotetradecanoic acid (PFTeDA)	376-06-7
Perfluoro-3-methoxypropanoic acid (PFMOPrA)	377-73-1
Fluorotelomer sulfonate 8:2 (8:2 FTS)	39108-34-4
Perfluoro(3,5-dioxahexanoic) acid (PFO2HxA)	39492-88-1
Perfluoro(3,5,7-trioxaoctanoic) acid (PFO3OA)	39492-89-2
Perfluoro(3,5,7,9-tetraoxadecanoic) acid (PFO4DA)	39492-90-5
PFO5DA	39492-91-6
N-ethylperfluoro-1-octanesulfonamide (N-EtFOSA)	4151-50-2
Perfluorononanesulfonate (PFNS)	474511-07-4
Perfluoro-2-methoxyacetic acid (PFMOAA)	674-13-5
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5
Perfluorotridecanoic acid (PFTrDA)	72629-94-8
Nafion Byproduct 2	749836-20-2
Perfluorooctanesulfonamide (PFOSA)	754-91-6
9-chlorohexadecafluoro-3-oxanonane-1-sulfonate (9Cl-PF3PONS)	756426-58-1 (d)
Fluorotelomer sulfonate 4:2 (4:2 FTS)	757124-72-4
11-chloroeicosafluoro-3-oxaundecane-1-sulfonate (11Cl-PF3OUdS)	763051-92-9 (c)
4-(Heptafluoroisopropoxy)hexafluorobutanoic acid (PFECA-G)	801212-59-9
Perfluoro-4-methoxybutanic acid (PFMOBA)	863090-89-5
Sodium dodecafluoro-3H-4,8-dioxanonanoate (ADONA)	919005-14-4(e)
PEPA NA	N/A
FBSA	30334-69-1

Submitting a Product for Testing

A vendor interested in having a product considered for qualification must submit samples of the product as noted below, SDS(s), technical data sheet(s), and Certificate of Analysis for the Series 300 sample bottles to NCDOT. **A check in the amount of two thousand dollars ($2,000.00) to cover the costs of the testing procedures must accompany the product samples, SDS, data sheets (procedures for usage and dilution rates), and bottle certification**. Only 12 each – 250 mL samples (total product volume of 3 L) in Certified I-Chem Brand 300 Series 250 mL Narrow-Mouth Glass Septa bottles will be accepted. I-Chem bottle number is S3490250 and is available from the following suppliers:

Fisher Scientific at https://www.fishersci.com
VWR International at http://www.vwr.com
Krackeler Scientific at http://www.krackeler.com
Thomas Scientific at http://www.thomassci.com

IF ALL DOCUMENTS AND/OR THE SAMPLES ARE NOT RECEIVED IN THE AFOREMENTIONED BOTTLE TYPE, THEY WILL BE DISPOSED OF AND THE COMPANY CHECK RETURNED**.**

Samples and all testing fees MUST be submitted during regular business hours (7:30 AM – 4:30 PM) between November 4 and 12, 2024 to:

NC Department of Transportation
Materials and Tests Unit
Chemical Lab
1801 Blue Ridge Road
Raleigh, NC 27607
Attention: Chip Lichtenwalner, Chemist II

Product samples will **NOT** be accepted before November 4, 2024 or after 4:30 PM November 12, 2024. All checks for the testing fees shall be made payable to NCDOT. Cash, money orders, and credit cards will NOT be accepted.

This will be the only opportunity during 2024 for products to be submitted for testing and qualification. **If your product contains a "trade secret" that you desire to keep private, please indicate so on your sample**.

Product Testing

NCDOT Materials and Tests Unit laboratory personnel will send one liter of the product to a NCDEQ State Certified, independent laboratory for analysis by the ASTM D-93, EPA 8260B and SM 4500 tests and one liter to a NCDEQ Certified, independent laboratory for PFAS screening. The Materials and Tests Unit will use the 250 milliliters for evaluation by the performance test method. The remaining 750 milliliters will be held as a control sample.

Upon completion of the testing, the Asphalt Solvent Testing Program Oversight Committee will review the test results. All products passing the aforementioned tests will be added to NCDOT's QPL for asphalt solvents.

Qualified Product Status

Products submitted in previous testing programs will not automatically retain their qualified status.

Once a product is "qualified," it will retain that status until the product is reformulated by the vendor. If the vendor/manufacturer reformulates the product, it may be deleted from the QPL and the new formulation must be submitted as a new product, with either a new product name or a unique formulation identifier, during the next available submission window.

As long as the manufacturer does not change the formulation of the product, the product will remain "qualified." However, during the product submission window, the vendor/manufacturer shall submit an official, notarized company statement certifying that no changes in formulation have been made to the product. This statement must be sent to:

NC Department of Transportation
State Maintenance Operations
4809 Beryl Road
Raleigh, NC 27606
Attn: Massiel Perez

A qualified product for which no certification statement is submitted will lose its "qualified" status and will be deleted from the QPL. The product will then have to be resubmitted as a new product during the next available product submission window.

Product Selection

Companies with products on the QPL will have an opportunity to submit a unit price per gallon via bid, which will be posted to the North Carolina eProcurement Vendor Portal (eVP) website; https://evp.nc.gov/ by the NCDOT Department of Transportation-Purchasing Unit. The company that bids the lowest unit price will be awarded the contract to supply asphalt solvents exclusively to NCDOT for three years. The awarded vendor will be responsible for maintaining their "qualified" status throughout the duration of the contract. If any formula changes are adopted during this period, the vendor must promptly notify NCDOT of such changes, and the qualification will be reevaluated.

Quality Assurance Testing

NCDOT will, at its discretion, take samples of qualified products directly from the manufacturer's facility prior to packaging for distribution for the purposes of Quality Assurance (QA) Testing. NCDOT Materials and Tests Unit personnel or agent of the Materials and Tests Unit will randomly sample three quarts of the product and that sample will be sent to an independent laboratory for testing. Any or all of the following tests may be performed to verify that the product continues to comply with the material specification: ASTM D-93, EPA 8260B,

SM 4500 tests, DoD QSM Table B-15 Isotope Dilution, NCDOT performance test, and FT-IR fingerprinting. NCDOT retains the right to acquire and test random samples of purchased, delivered material. The vendor, at the vendor's expense, shall reclaim any delivered product found to be out of compliance with the material specification. If a second random QA test procedure determines that a delivered product again does not meet the material specification, the product may be removed from the QPL.

Performance Test Method

The following test method will be used to quantify the efficacy of the solvents used by NCDOT to remove asphalt:

Step 1. Number each aluminum dish and determine its weight. The dishes used are "Fisherbrand Aluminum Weighing Dishes" with fluted sides. The catalog number is 08-732 and the capacity of each dish is 42 ml.

Step 2. Apply 1.5g of emulsified asphalt (CRS-2) into the standard aluminum dish ensuring that asphalt emulsion fully covers the bottom surface area of the dish.

Step 3. Heat the aluminum dish, with asphalt emulsion, for 24 hours at the temperature of 140ºF.

Step 4. Remove the dish after 24 hours and cool it to room temperature. Determine the weight of the dish and calculate the weight of residual asphalt.

Step 5. Apply 0.5g of solvent into the dish by dropper. Make sure that the asphalt remains completely submerged in the solvent for 5 minutes.

Step 6. Let the dish drain for 5 minutes by putting it upside down.

Step 7. Rinse the dish thoroughly for 5 minutes under running water.

Step 8. Heat the dish at 140ºF for 15 hours to remove the traces of water completely.

Step 9. Weigh the dish to calculate asphalt removed.