

Appendix F – Connecticut Reference File (CRF) Specifications

The following CRF's are active.

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BLACK ENAMEL PAINT

REFERENCE FILE NO. 25—G

Issued March 10, 1953

Revised November 2, 1981

GENERAL — This material shall be shipped in regulation 1—gallon metal pails. Each container shall be marked with the following: name and type of paint, net weight, batch number, date of manufacture and State of Connecticut reference file and purchase order numbers, together with name and address of the manufacturer. When so requested, samples and analyses of all pigments, oils, resins, thinners and driers used for the enamel furnished shall be supplied by the manufacturer within ten days after request is made therefore.

A certified test report containing the physical and chemical properties of the material shall be submitted with each batch shipment.

The enamel shall consist of pigments and composition ground in the required vehicle by a suitable grinding machine to the required fineness. All pigments, oils, resins, thinners and driers used shall be of the best quality, free from adulterants of any kind and shall comply with the specific requirements given below. The enamel shall not contain any lead or lead by products.

The material desired under this specification is an extremely durable, highest quality black enamel for use on highway signs, and shall be resistant to air, sun and water.

COLOR — The color shall be jet black, conforming to Federal Standard No. 595, Color No. 17038.

ENAMEL COMPOSITION

	MIN.	MAX.
Carbon Black, %	3	4
Total solids, % by weight	42	-
Coarse particles retained on #325 screen based on paint, %	-	0.5
Weight per gallon, lb.	7.5	--
Viscosity, Krebs units at 77°F.	67	77
Fitness of grind (North Standard)	7	--

PIGMENT COMPOSITION — The pigment shall be carbon black only.

VEHICLE - The vehicle shall consist of a phthalic alkyd resin conforming to the requirements of Federal Specification TT—R-266, Type 3, of latest issue, with the following exceptions: Viscosity - Z maximum; Compatibility — delete raw linseed oil and mineral spirits dilution tests. The necessary quantities of suitable aliphatic, aromatic or terpene thinners and driers shall be added to yield a product conforming to all the requirements of this specification.

SPECULAR GLOSS - The enamel shall be flowed on a tin panel and allowed to dry for 24 hours before measuring. The specular gloss at 60° angle of incident, ASTM designation D523 of latest issue, shall be not less than 85.

SETTING AND DRYING TIME — This enamel shall air dry dust free within 2 hours, dry hard within 8 hours and reach full hardness within 48 hours.

DRY OPACITY — This enamel shall have a contrast ratio of at least 0.99 when spread at the rate of 630 sq. ft. per gallon (0.0025—inch wet film thickness).

WATER RESISTANCE — A film of enamel 0.002 inch thick shall be allowed to air dry for 96 hours, and then immersed in distilled water for 16 hours. It shall show no blistering or wrinkling immediately upon removal and no more than slight dulling or whitening after 2 hours recovery. After 24 hours, the gloss of the immersed portion shall be at least 90 percent of a comparison panel, which was not immersed.

FLEXIBILITY - A film of enamel 0.002 inch thick shall be allowed to dry for 18 hours, then baked for 72 hours at 105± 2°C, allowed to cool for 1/2 hour at 25°C (77°F), then bent over an 1/8—inch mandrel. There shall be no visible cracks when examined in a strong light at a 7—diameter magnification.

SKINNING — The enamel shall not skin within 48 hours in a three—quarter filled, closed container. Small amounts of anti—skinning agents, wetting agents, suspension agents and anti—drier agents may be added at the discretion of the manufacturer.

WORKING PROPERTIES — The enamel shall be well ground and shall show no more settling or caking than may be easily redispersed with a paddle to a homogeneous state. It shall be of good brushing consistency and shall dry to a smooth, glossy, uniform film, free from running, sagging or streaking.

BURNT ORANGE ENAMEL PAINT FOR TRUCKS (LEAD FREE)

REFERENCE FILE NO. 104-P

Issued May 17, 1945

Revised January 25, 1999

INTENDED USE – This specification covers a lead-free high-grade, synthetic-type high gloss enamel intended for use on trucks and other metallic motorized mechanical equipment. It is highly weather-resistant and is characterized by excellent color and gloss-retention, good drying, flexibility and freedom from aftertack. This enamel may be applied by brush or spray. It fails by mild chalking rather than by checking or cracking. The application of wax at periodic intervals will retard chalking and improve the appearance of the finish.

GENERAL – This material shall consist of pigments of the required fineness and composition, ground in the specified vehicle by a suitable grinding machine to the required fineness. All pigments, oils, resins, thinners and driers shall comply with the requirements below.

This enamel shall be shipped in regulation one-or five-gallon metal pails, as specified by the Purchasing Department. Each container shall be marked with the following: name and type of paint, net weight, batch number, date of manufacture and State of Connecticut Reference File and Purchase Order Numbers, together with the name and address of the manufacturer. When so requested, samples and, analyses of all pigments, oils, resins, thinners, and driers used shall be supplied by the manufacture within ten (10) days after request is made.

COLOR – Standard color chips may be viewed at the Connecticut Department of Transportation, Research and Materials Testing Laboratory, 280 West Street, Rocky Hill, Connecticut 06067. The color shall essentially match that of color Omaha Orange, DuPont #082.

VEHICLE - The vehicle for this air-drying enamel shall consist of a phthalic alkyd resin.

Necessary quantities of suitable aliphatic, aromatic or terpene thinners and driers, or mixture thereof, shall be added to yield a product conforming to all the requirements of this specification. Small amounts of antiskinning agents, wetting agents, suspension agents and antidrier absorption agents may be added at the discretion of the manufacturer.

QUANTITATIVE REQUIREMENTS	Min.	Max.
Pigment, % by weight	16	
Vehicle, % by weight	--	84
Volatile matter in vehicle, % by weight	--	55
Coarse particles and skins retained on #325 sieve, % by weight of pigment	--	0.5
Viscosity, Krebs units at 77°F.	75	85
Specular gloss (without correction for diffuse reflectance)	85	
Fineness of grind (North Standard)	6	
Dry opacity (540 sq. ft. per gallon)	0.52	
Weight per gallon, lbs.	8.0	
Drying time: Dust-free setting time, hours	--	1
Dry hard, hours	--	8
Full hardness, hours	--	48

BRUSHING PROPERTIES – As received, this enamel shall be ready-mixed for use. It shall be of good brushing consistency in the packaged condition. When tested as described below, laps shall be picked up without pulling under the brush; and the enamel shall dry to a smooth, glossy, uniform film, free from running, sagging or streaking.

Brush the evenly mixed enamel on a thoroughly cleaned, rust-free, smooth, cold-rolled steel or aluminum panel (2 ft. square) with a 2-1/2 inch paint brush, applying the enamel uniformly at an approximately spreading rate of 500 square feet per gallon. Place the panel in a nearly vertical position, allow to air dry for 24 hours and examine for defects described above.

DRYING TIME – A wet film, 0.0015-inch thick, shall set to a dust-free condition within one hour, dry hard and tack-free within 8-hours and reach full hardness within 48 hours.

FILM FOR FLEXIBILITY, WATER-RESISTANCE AND GASOLINE-RESISTANCE – Tin panels, measuring 4 by 6 inches and weighing 19 to 25 grams per square centimeter, will be used for this test. They will be thoroughly cleaned with a suitable solvent and lightly buffed with steel wool immediately before using. Apply the film with a 0.002-inch (approximately 0.004-inch gap clearance). Bird Film Applicator or any other doctor blade which produces a film of the same thickness as that produced by the Bird blade.

FLEXIBILITY – Films prepared as above shall be allowed to air dry in a horizontal position for 18 hours, then baked for 168 hours at $105 \pm 2^{\circ}\text{C}$ ($221 \pm 4^{\circ}\text{F}$). After baking, condition the panel for one-half hour at $23 \pm 1^{\circ}\text{C}$ ($73.4 \pm 2^{\circ}\text{F}$) and relative humidity 50% - 4%. Bend over a 1/8 inch mandrel. Examine the coating for cracks over the area of the bend in a strong light at a 7-diameter magnification. The film of the enamel shall show no cracking.

APPEARANCE OF FILM AFTER BAKING – After drying and baking the panel for flexibility, the enamel film shall retain at least 75 percent of the original secular gloss value.

ADHESION – In testing for adhesion, use the flat portion of the panel from the flexibility test. Cut a narrow ribbon of the film from the panel by use of the sharp knife blade held at about 30 degrees from the panel. The film should cut loose in the form of a ribbon without flaking or cracking.

COLOR WATER RESISTANCE – After drying for 96 hours, place one of the test panels in a beaker containing approximately 2-1/2 inches of distilled water at room temperature (21 to 32°C), and allow to remain for 16 hours. Remove and allow to dry. The film shall show no blistering or wrinkling immediately upon removal from the water. There shall be no more than a slight dulling or whitening when examined 2 hours after removal of the panels and after 24 hours of air drying, the gloss of the immersed portion shall be at least 90 percent of the gloss of a comparison panel which was not immersed. The immersed and comparison panel shall be indistinguishable with regard to film hardness after the 24 hours of air drying.

GASOLINE RESISTANCE – After drying for 96 hours, place one of the panels in a beaker containing approximately 2-1/2 inches of gasoline conforming to Federal Specification VVG-1690, cover with a watch glass and allow to remain at room temperature (21 to 32°C), for 16 hours. Remove and allow to dry. The film shall show no blistering or wrinkling immediately upon removal of the panel, and any softening or whitening effect that may remain two hours after removal shall have completely disappeared after air drying for 24 hours. The immersed portion shall retain at least 50 percent of the gloss of a comparison panel which was not immersed.

DRY OPACITY – At a spreading rate of 540 square feet per gallon, this enamel shall have a minimum dry-film contrast ratio of not less than 0.98.

MISCIBILITY WITH MINERAL SPIRITS – Mix thoroughly one part of mineral spirits conforming to Grade I of Federal Specification AA-2904 with eight parts of enamel by slowly adding the mineral

spirits to the enamel with constant stirring. The enamel shall be completely missible with mineral spirits. After standing 24 hours there shall be no curdling or precipitation of the vehicle. Any settling of the pigment shall be disregarded.

SKINNING – The enamel shall not skin within 48 hours in a three-quarters filled, closed container.

RESIN – Resin and resin derivatives shall be absent.

RECOATING – Recoating after 24 hours air drying shall produce no film irregularity.

ODOR – The odor of the wet enamel and of the dry film shall not be obnoxious.

TOXICITY – The enamel shall contain no benzol or chlorinated solvents.

PARTIALLY FILLED CONTAINER – After standing 30 days at a temperature between 21 and 32°C, a three-quarters filled, closed 8-ounce glass jar of the enamel shall show no livering, curdling, hard settlement or caking. Any skin formed shall be continuously and easily removed, and the enamel shall mix readily to a smooth, homogeneous state.

FULL CONTAINER - Upon being opened after six months of storage under warehouse storage conditions, a full, closed container shall show no livering or curding of the enamel and no more settling than can be redispersed with a paddle to a homogeneous state. There shall be no hard settlement or caking and no skinning. The viscosity shall not have increased more than an equivalent of 10 K.U. during the storage period. The enamel shall have retained its drying properties and shall dry to a full gloss finish, free from grit and seediness.

APPLICABLE FEDERAL SPECIFICATIONS AND STANDARDS –

A-A2504	Thinners; Paint, Volatile Mineral Spirits
VV-3-1690	Gasoline, Automotive
141	Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

GRADE NUMBER TWO (D2) DIESEL FUEL OIL

REFERENCE FILE NO. 126-H

Issued November 15, 1950

Revised April 14, 1998

Scope: This specification covers the requirements for grade number two (D2) Diesel Fuel oil.

General Requirements: The Grade Number Two (D2) Diesel Fuel Oil Specified herein shall be hydrocarbon oil, free from acid, grit, salt water and fibrous or other foreign matter, and shall conform to the requirements of ASTM D 975 ammended as follows:

API GRAVITY, AT 15.6 °C	MINIMUM : 34 MAXIMUM : 36
CETANE INDEX (Minimum)	46
CLOUD POINT	AS REQUIRED
POUR POINT	AS REQUIRED
FLASH POINT	LEGAL LIMIT
KINEMATIC VISCOSITY mm ² /S at 40 °C	1.9 to 4.1
WATER AND SEDIMENT (Maximum %)	0.10
ASH (Maximum %)	0.02
TOTAL SULFUR (Maximum %)	0.05
CONRADSON CARBON	
IN 10% RESIDUUM (Max %)	0.02
OXIDATION STABILITY	MINIMAL
DISTILLATION °C	
INITIAL BOILING POINT (Min.)	160 °C
50% Distilled (Max.)	266 °C
90% DISTILLED (Max.)	310 °C
END POINT	343 °C
COPPER STRIP CORROSION	#3
BIOLOGICAL	NEGATIVE

This specification represents the average for a 12-month period and should vary only according to the specific local demands for blending to achieve the REQUIRED POUR POINT AND CLOUD POINT LEVELS.

The specifications of the BLENDING PRODUCT must conform to the BASE FUEL to ensure normal combustion and flame propogation.

SODIUM CHLORIDE (ROCK SALT)

REFERENCE FILE NO. 139R

Issued July 7, 1955

Revised June 1, 2002

Scope: This specification prescribes the composition, storage, inspection, acceptance and delivery of road salt obtained from (natural deposits/artificially produced) which is to be used for snow & ice control on highways and bridges.

Requirements: All road salt shall conform to AASHTO M 143 (ASTM D—632) Type 1, with the exceptions and additions stated herein. When material is not in conformance as stated herein, and the state formally agrees to accept such material, payment reduction shall apply and will be the sum of the individual reductions based on the bid price.

Inspection & Testing: At the vendor’s location the stockpile shall be covered as required and the road salt shall be tested by Division of Materials Testing. The Bureau of Finance and Administration shall accept the material prior to any shipment to the State. Road salt from different origins (natural deposits/artificially produced) shall be stockpiled separately. If at any time, the purity of road salt is less than 95 percent sodium chloride, the vendor shall maintain this material in a physically separated stockpile. Once the stockpile has been accepted, material shall not be added to the stockpile without prior notification to and additional testing by the State. Failure to properly control these stockpiles may result in revocation of the award.

Material acceptance:

PURITY: The road salt requirements for material acceptance shall be as stated in AASHTO M—143 (ASTM D—632) Type 1, except sections 9.1.2 and 11.2 will not apply. It is intended that only products meeting the specified sodium chloride content (95.0 percent or greater) will be accepted; however, at the sole discretion of the Department of Transportation, road salt having a purity of less than 95.0 percent sodium chloride content may be accepted with an adjustment in payment in accordance with Table 1.

TABLE 1: Adjustment in Payment for Purity of Sodium Chloride

Percent of Sodium Chloride	Percent Payment of Unit Bid Price
95.0% to 100%	100
93.0% to 94.9%	95
91.0% to 92.9%	90
90.9% & below	73

Grading: The gradation requirements for material acceptance shall be as stated below. Failure to conform to these requirements may result in rejection of the stockpile. If non-conforming material is accepted, a reduction in payment of 2 percent per screen shall be assessed for deviations in the gradation.

Sieve Size	Percent Passing by Weight
12.5 mm (1/2in.)	100
9.5 mm (3/8in.)	95 to 100
4.75 mm (No.4)	20 to 90
2.36 mm (No.8)	10 to 60
600 µm (No.30)	0 to 15

Moisture: Full payment will apply to the road salt when its moisture content does not exceed two (2.0) percent. Road salt with a moisture content greater than (2.0) percent may be accepted at the discretion of the Department, with an adjustment in weight for moisture content over 2.0 percent.

Anticaking Agent: Road salt furnished under this contract shall be free flowing and granular. All bulk road salt shall be treated with an approved conditioner, such as sodium ferrocyanide, to prevent caking while in storage. This treatment shall be prior to shipping product from the origin (natural deposits/artificially produced). This conditioner shall be visible and introduced uniformly throughout the road salt at a maximum rate of 50 parts per million or 0.0050 percent.

NON-REFLECTIVE PLASTIC SHEETING

REFERENCE FILE NO. 161-D

Issued October 19, 1962

Revised June 10, 1983

Description: The material shall consist of a flexible, pigmented plastic film, completely pre-coated with a solvent or heat-activated tack-free adhesive. The adhesive shall be protected by a paper liner, which shall be removable without soaking in water or other solvents.

Property Requirements:

A. Thickness: The thickness of the plastic film with adhesive shall be a minimum of 0.003 inches and a maximum of 0.0045 inches.

B. Film: The unapplied and/or applied film shall be readily processed with, and ensure adequate adhesion of, process inks recommended by the manufacturer.

1. Flexibility: The material shall be sufficiently flexible to permit application over and conform to moderately contoured surfaces.

2. Gloss: The film shall have an initial 60-degree gloss value of 35 (minimum), when tested in accordance with ASTM Method D 523, measuring at least three portions of the film to obtain uniformity.

C. Adhesive: The pre-coated adhesive shall form a durable bond to smooth, clean, corrosion- and weather-resistant surfaces, shall be of uniform thickness, non-corrosive to applied surfaces and shall have no staining effect on the film.

Adhesion: The material, applied according to Paragraph I "Preparation of Test Panels" shall have sufficient bond to prevent removal from the panel in one piece without the aid of a physical tool.

D. Exterior Exposure: The material shall withstand three years' vertical, south-facing exterior exposure in Texas, showing no appreciable discoloration, cracking, crazing, blistering, delamination or loss of adhesion. A slight amount of caulking is permissible.

E. Dimensional Stability: The material shall show no more than 1/64" shrinkage in any direction from edge of the panel when prepared in accordance with Paragraph I after being subjected to a temperature of 150° F for 48 hours.

F. Heat Resistance: The material applied according to Paragraph I, shall be heat-resistant enough to retain adhesion after one week at 150° F.

G. Solvent and Chemical Resistance: The material, when prepared in accordance with Paragraph I, shall withstand immersion in the following liquids at 70°-90° F, showing no appreciable

decrease in adhesion, color or general appearance.

Liquids

		Time, Hours
Reference Fuel (MIL-F-8799A) (15 parts xylol – 85 parts mineral spirits by weight)	1	
Distilled Water		24
SAE #20 Motor Oil		24

H. Opacity: when applied, the material shall be sufficiently opaque to hide a contrasting black printed legend and white surface.

I. Preparation of Test Panels: Test panel shall be prepared using a 6 ½" x 6 ½" piece of the plastic film, applied to a clean 6" x 6" aluminum panel, pre-masked or as recommended by the manufacturer, trimmed evenly at the edge of the panel, and aged for 48 hours at 70-90°F.

J. Shelf Life Storage: The material shall withstand one year's shelf life when stored in a clean area free from exposure to excessive heat, moisture, and direct sunlight.

K. General Characteristics and Packaging: The plastic film shall be furnished in rolls, cut sheets or characters as may be specified. The film, as supplied, shall be free from ragged edges, streaks, blisters, foreign matter, or other surface imperfections which would make it unsuitable for the intended usage, and shall be readily cut with scissors, knife, blade, shears, or other production tools. Complete and detailed instructions for mounting the plastic film shall be supplied with each package of material.

Rolls, sheets or letters shall be individually packaged in suitable containers and in such a manner that no damage or defacement may occur to the plastic film during transport to destination.

Quality Assurance: The vendor shall furnish a Certified Test Report conforming to the requirements stated herein below for all materials supplied under this specification.

1. A Certified Test Report is a document containing a list of the dimensional, chemical, and physical results obtained by an approved testing organization from an actual test of the material involved. It shall also certify that the materials meet the requirements of the specifications and shall include the following information:

- a. Description of material
- b. Connecticut Department of Transportation purchase order number.
- c. Date of manufacture.
- d. Date of testing.
- e. Name of organization to which the material is consigned.
- f. Quantity of material represented.
- g. Means of identifying consignment such as label, marking, lot number, etc.
- h. Date and method of shipment.
- i. Name of organization performing the tests.

EACH SHIPMENT SHALL BE ACCOMPANIED BY A CERTIFIED TEST REPORT. THIS REPORT SHALL STATE THAT MATERIAL FURNISHED WILL CONFORM TO THE SPECIFICATIONS IN EVERY DETAIL. The Certified Test Report shall be signed by an authorized and responsible agent for the organization supplying the material. The certificate MUST be notarized.

PROCESSED AGGREGATE

REFERENCE FILE NO. 163-J

Issued: March 4, 1963

Revised: June 26, 2001

Description: The materials shall conform to the following requirements:

Gradation: Coarse and fine aggregates shall be combined and mixed by approved methods so that the resulting material shall conform to one of the following gradation requirements as specified:

PERCENT PASSING BY WEIGHT		
Square Mesh Sieves (in.)	Medium	Coarse
2 1/2	-	100
2	-	95-100
1 1/2	100	-
1	90-100	-
3/4	75-100	50-75
1/4	30-60	25-45
#40	5-25	5-20
#100	3-12	2-12

Coarse Aggregate: Coarse aggregate shall be either gravel or broken stone, at the option of the ConnDOT; however, only one type of coarse aggregate shall be used for one order. When tested by means of the Los Angeles Machine using AASHTO Method T 96, the coarse aggregate shall have a loss of not more than 50 percent.

- (a) If gravel is used for the coarse aggregate, it shall consist of sound tough, durable particles of crushed or uncrushed gravel or a mixture thereof, free from soft, thin, elongated or laminated pieces, lumps of clay, loam, and vegetable or other deleterious substance.
- (b) If broken stone is used for the coarse aggregate, it shall consist of sound, tough, durable fragments of rock of uniform quality throughout. It shall be free from soft, disintegrated pieces, mud, dirt, organic or other injurious material.
- (c) **Soundness for Gravel, Broken Stone:** When tested by magnesium sulfate solution for soundness using AASHTO Method T 104, the coarse aggregate shall show a loss of not more than 15 percent at the end of five cycles.

Fine Aggregate: The fine aggregate shall be natural sand, stone sand, screenings or any combination thereof. The fine aggregate shall be limited to material 95 percent of which passes No. 4 sieve having a square opening and not more than 8 percent of which passes a No. 200 sieve. The material shall be free from clay, loam and deleterious materials.

Plasticity: when natural sand is used, the following requirements shall apply.

- (a) When the fraction of the dry sample passing the No. 100 mesh sieve is 4 percent or less by weight, no plastic limit test will be made.

- (b) When the fraction of the dry sample passing the No. 100 mesh sieve is greater than 4 percent but not greater than 8 percent by weight, that fraction shall not have sufficient plasticity to permit performance of the plastic limit test using AASHTO Method T 90.
- (c) When the fraction of the dry sample passing the No. 100 mesh sieve is greater than 8 percent by weight, the sample shall be washed; and additional material passing the No. 100 mesh sieve shall be determined by AASHTO Method T 146, except that No. 100 mesh sieve shall be substituted for the No. 40 mesh sieve where the latter is specified in AASHTO Method T 146. The combined materials that have passed the No. 100 mesh sieve shall not have sufficient plasticity to permit the performing of the plastic limit test using AASHTO Method T 90.

Plasticity: When screenings or any combination of screenings and natural sand are used, the following requirement shall apply:

- (a) When the fraction of the dry sample passing the No. 100 mesh sieve is 6 percent or less by weight, no plastic limit test will be made.
- (b) When the fraction of the dry sample passing No. 100 mesh sieve is greater than 6 percent but not greater than 10 percent by weight, that fraction shall not have sufficient plasticity to permit performance of the plastic limit test using AASHTO Method T 90.
- (c) When the fraction of the dry sample passing the No. 100 mesh sieve is greater than 10 percent by weight, the sample shall be washed; and, additional material passing the No. 100 mesh sieve shall be determined by AASHTO Method T 146, except that the No. 100 mesh sieve shall be substituted for the No. 40 mesh sieve where the latter is specified in AASHTO Method T 146. The combined materials that have passed the No. 100 mesh sieve shall not have sufficient plasticity to permit the performing of the plastic limit test using AASHTO Method T 90.

SAND FOR AIRPORTS

REFERENCE FILE NO. 179E

Revised: September 2003

SCOPE: This specification applies to friction improving mineral sand to be used for airport movement surfaces.

SAND¹:

Friction improving materials applied to airport movement surfaces shall consist of washed granular mineral sand particles free of stones, clay, debris, slag, and chloride salts and other corrosive substances. The pH of the water solution containing the material shall be neutral (pH ≈ 7).

Material for use at Connecticut airports shall meet the following FAA Federal Aviation Administration) recommended gradation.

SAND GRADATION REQUIRED FOR CONNECTICUT AIRPORTS (USA Standard Sieves – ASTM E11)

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING
#8	100
#30	20-50
#80	0-2

COVER SAND FOR SNOW AND ICE CONTROL

REFERENCE FILE NUMBER 182-G

Issued March 12, 1976

Revised June 15, 2001

SCOPE: This specification applies to Sand for snow and ice control.

DESCRIPTION: This sand shall consist of clean, hard durable and uncoated particles of quartz or other rock and shall be free from lumps of clay, soft or flaky material, loam or other detrimental material. It shall contain no more than five percent (5%) of material finer than the #200 sieve, using AASHTO Method T 11 and shall conform to the following gradation requirements:

Square Mesh Sieve	(inches)	% of Passing By Mass
3/8		100
#4		70-100
#50		0-40
#100		0-15
Material Finer than	#200	0-5

Washed Sand: If washed sand is supplied, it shall be stockpiled at least twenty-four (24) hours before use.

¹ Federal Aviation Administration, Change 3 to Airport Winter Safety and Operations, Advisory Circular No. 150/5200-30A

In no case shall sand be used that contains frozen lumps or other detrimental material.

GRITS

REFERENCE FILE NO. 191-E

Issued January 14, 1980

Revised June 29, 2001

DESCRIPTION: Grits shall consist of sound, tough, durable particles of crushed or uncrushed screened stone or gravel, and shall be free from lumps of clay, soil, loam or organic matter. All plus No. 8 material shall not contain more than 15 percent of flat or elongated pieces, the longest dimensions of which exceed three times the maximum thickness.

MATERIALS REQUIREMENTS: Grit material shall conform to requirements as follows:

1. **Soundness:** When tested for soundness with a magnesium sulfate solution using AASHTO Method T 104, the plus No. 4 fraction shall show a loss of not more than 10 percent at the end of five cycles.
2. **Loss on Abrasion:** When tested by means of the Los Angeles Machine using AASHTO Method T 96, the plus No. 8 fraction shall show a loss on abrasion of not more than 40 percent.
3. **Grading:** The grit material shall conform to one of the gradations shown below. The grit material shall be specified on the purchase order.

	Grading A	Grading B
Sieve Size (inches)	Percent Passing	Percent Passing
3/8 mm	100	100
#4	40-90	85-100
#8	0-30	10-40
#16	---	0-10
#50	0-10	0-5
#100	0-3	---

PREMIXED SODIUM CHLORIDE (Salt) AND CALCIUM CHLORIDE

REFERENCE FILE NUMBER 194-E

Issued March 12, 1976

Revised June 1, 1998

SCOPE:

This specification covers a premixed blend of sodium chloride (rock salt) and calcium chloride to be used for ice control on highways and bridges.

DESCRIPTION:

Sodium Chloride: The sodium chloride shall conform to the requirements of Reference File 139, latest revision.

Calcium Chloride: The calcium chloride shall conform to the requirements of AASHTO M 144, Type I.

MIXTURE:

The premix for the CONTNDOT shall be a completely uniform and free-flowing mixture of three parts sodium chloride by weight to one part flake calcium chloride by weight.

SAMPLES FOR TEST:

Before a purchase order is issued, vendor(s) awarded the contract must forward, UNBLENDED, a thirty-pound bag of sodium chloride and a ten-pound bag of calcium chloride to be used for test to the Director of Research and Materials, 280 West St., Rocky Hill, CT 06067.

GENERAL:

The State reserves the right to inspect or sample material at the place of manufacture or stockpile, or to test materials before accepting delivery.

EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

REFERENCE FILE NO. 199-C

Issued: November 1, 1985

Revised: October 30, 1995

DESCRIPTION: This specification covers reflectorized white and yellow two component epoxy resin to be used for pavement marking on both asphaltic and Portland cement concrete pavement surfaces. It is to be used in conjunction with a surface application of glass beads and in accordance with these requirements. Upon curing, it produces an adherent reflectorized stripe of specified thickness and width capable of resisting wear from traffic.

CLASSIFICATION: This specification provides for the classification of epoxy resin pavement marking system by type.

- | | |
|---------|---|
| Type I | A fast—cure material suitable for centerline, skipline and edgeline use under traffic conditions |
| Type II | A slow—cure material suitable for centerline, skipline and edgeline use under minimal traffic conditions; e.g., unopened roadways |

Type III A medium—cure material suitable for pavement marking message and transverse line work

MATERIALS -GENERAL REQUIREMENTS:

Standards - All standards herein are minimum standards.

Identification: Each container must bear a label with the following information thereon: Name and address of manufacturer, shipping point, grade production batch number, date of manufacture, shipping point, grade name and/or identification number, type of material, number of gallons, contract number, use intended, directions for application, and formula. Improperly labeled samples and deliveries will be rejected.

Qualification of Manufacturer: No material will be considered unless the firm submitting the material can meet the following conditions (these qualifications must be provided to approve a subcontractor for this work):

- a: that it has in operation a factory adequate for and devoted to manufacturer of the pavement marking material that it proposes to furnish;
- b. that it is capable of predicting batch sizes consistent with the quantities to be delivered;
- c. that it maintains a laboratory to scientifically control the product bid on to ensure accuracy and quality of formulation; and
- d. that it has produced pavement marking material over the past two (2) years with a successful application record.

Certification: The manufacturer shall furnish a certified test report by an independent testing laboratory prior to the start of work indicating that the material as specified has been tested in accordance with ASTM or ACI testing procedures noted in this specification. The certified test report shall indicate the results of testing for the following criteria:

Composition, Color, Adhesion Capabilities, Abrasion Resistance, Hardness, Tensile Strength, and Compressive Strength.

Additionally, infrared spectrophotometer plots for both components of the test material shall be included by the independent laboratory in the certified test report.

The manufacturer shall furnish certified test reports for each batch delivered for application at the project site. Certified test reports shall be in accordance with the State of Connecticut, Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Section 1.06.07 of the latest edition,

MATERIALS - DETAILED REQUIREMENTS:

Epoxy Resin Material: The material shall be composed of epoxy resins and pigments only. No solvents to be given off to the environment upon application to the pavement surface, nor fillers, will be allowed.

<u>Composition:</u>	WHITE (percent by weight) 20 ± 2 Titanium Dioxide (ASTM D 476 Type III) 80 ± 2 Epoxy Resins	YELLOW (percent by weight) 20 ± 2 Chrome Yellow (ASTM D211 Type III) 75 ± 2 Epoxy Resins
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Color: The color of the WHITE material shall be no darker or yellower than color chip 17778 of Federal Standard No. 595a of the latest issue, when the material is placed in a Type EH weatherometer for a period of 500 hours and weathered according to ASTM F 42. The color of

the YELLOW shall be reasonably close to color chip 13538 of the Federal Standard No. 595a of the latest issue.

Adhesion Capabilities: When the adhesion of the material to Portland cement concrete (the concrete shall have a minimum of 300 psi tensile strength) is tested according to American Concrete Institute Committee 503R testing procedure, the failure of the system must take place in the concrete. The concrete shall be 32 °C when the material is applied, after which the material shall be allowed to cure for 72 hours at 23 ± 2 °C.

Abrasion Resistance: When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The index is the weight in milligrams that is abraded from the sample under the test conditions)

Hardness: The Type D durometer hardness of the material shall be not less than 75 or more than 90 when tested according to ASTM D 2240 after the material has cured for 72 hours at 23 ± 2 °C.

Compressive Strength: The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 12,000 psi after 72 hours cured at 23 ± 2 °C.

Shelf Life: The individual components shall not require mixing prior to use when stored for a period of 12 months.

Glass Beads: The moisture resistant glass beads shall meet the requirements of AASHTO M 246, except that glass spheres shall meet the gradation requirements as follows:

<u>Grading "A"</u>		<u>Grading "B"</u>	
<u>Sieve Size</u>	<u>Percent</u>	<u>Sieve Size</u>	<u>Percent</u>
% Passing #20	100	% Retained #10	0
% Passing #30	80—95	% Retained #12	0—5
% Passing #50	9—42	% Retained #14	5—20
% Passing #80	0—10	% Retained #16	40—80
		% Retained #18	10—40
		% Retained #20	0—5
		% Retained Pan	0—2

Glass beads conforming to the requirements of Grading "A" shall be applied at a rate of 25 pounds per gallon of epoxy pavement marking material.

If specified, glass beads conforming to the requirements of Grading "B" shall be applied at a rate of 12 pounds per gallon of epoxy pavement marking material, immediately followed by a scanned drop of glass beads conforming to the requirements of Grading "A" applied at a rate of 12 pounds per gallon of epoxy pavement marking material.

Traffic cones or any other acceptable method shall be used to protect the pavement marking until cured.

Time To No—Track: The Type I material shall be in "no—tracking" condition in 60 seconds or less.

The no-tracking condition shall be determined by actual application on the pavement of the pigmented binder at 20 mils wet, covered with glass spheres at a rate of 25 pounds per gallon. The lines for this test shall be applied with the specialized striping equipment operated so as to have the material at the manufacturer's recommended application temperature. This maximum no—tracking time shall not be exceeded when the pavement temperature varies from 50 °F to 120 °F, and under all humidity conditions, provided the pavement is surface dry.

The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck in the simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 50 feet shall be considered as showing "no— tracking" and conforming to this requirement for time to no-track.