

Patricia A. Peshka
Purchasing Agent



Scott Avedisian
Mayor

City of Warwick
Purchasing Division
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The following notice is to appear on the City of Warwick's website Thursday, March 23, 2017. The website address is <http://www.warwickri.gov/bids>.

**CITY OF WARWICK
BIDS REQUESTED FOR**

Bid2018-015 Street Striping

Specifications are available in the Purchasing Division, Warwick City Hall, Monday through Friday, 8:30 AM until 4:30 PM on or after Thursday, March 23, 2017.

Sealed bids will be received by the Purchasing Division, Warwick City Hall, 3275 Post Road, Warwick, Rhode Island 02886 up until 11:00 AM, Wednesday, April 12, 2017. The bids will be opened publicly commencing at 11:00 AM on the same day in the Lower Level Conference Room, Warwick City Hall.

Awards shall be made on the basis of the lowest evaluated or responsive bid price. Please note that no bids can be accepted via email or fax.

Individuals requesting interpreter services for the hearing impaired must notify the Purchasing Division at 401-738-2013 at least 48 hours in advance of the bid opening date.

Original Signature on File

Patricia A. Peshka
Purchasing Agent

PLEASE SUBMIT THIS PAGE WITH YOUR BID

Acknowledgement of Addendum (if applicable)

Addendum Number	Signature of Bidder
_____	_____
_____	_____

COMPANY NAME: _____

COMPANY ADDRESS: _____

COMPANY ADDRESS: _____

BIDDER'S SIGNATURE: _____

BIDDER'S NAME (PRINT): _____

TITLE: _____ TEL. NO.: _____

EMAIL ADDRESS: _____*

*Please include your email address. Future bids will be emailed, unless otherwise noted.

II. AWARD AND CONTRACT:

The CITY OF WARWICK, acting as duly authorized through its Purchasing Agent/Finance Director/Mayor (delete if inapplicable), accepts the above bid and hereby enters into a contract with the above party to pay the bid price upon completion of the project or receipt of the goods unless another payment schedule is contained in the specifications. All terms of the specifications, both substantive and procedural, are made terms of this contract.

DATE: _____
Bid2018-015 Purchasing Agent

CERTIFICATION & WARRANT FORM*

**This form must be completed and submitted with sealed bid.
Failure to do so will result in automatic rejection.**

Any and all bids shall contain a certification and warrant that they comply with all relevant and pertinent statues, laws, ordinances and regulations, in particular, but not limited to Chapter 16- Conflicts of Interest, of the Code of Ordinances of the City of Warwick. Any proven violation of this warranty and representation by a bidder at the time of the bid or during the course of the contract, included, but not limited to negligent acts, either directly or indirectly through agents and/or sub-contractors, shall render the bidder's contract terminated and the bidder shall be required to reimburse the City for any and all costs incurred by the City, including reasonable attorney fees, to prosecute and/or enforce this provision.

Signature

Date

Company Name

Address

Address

***This form cannot be altered in any way**

**CITY OF WARWICK
NOTICE TO BIDDERS**

Bid2018-015 Street Striping

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If you received this document from our homepage or from a source other than the City of Warwick Purchasing Division, please check with our office prior to submitting your bid to ensure that you have a complete package. The Purchasing Division cannot be responsible to provide addenda if we do not have you on record as a plan holder.

Bids received prior to the time of the opening will be securely kept, unopened. No responsibility will be attached to an officer or person for the premature opening of a bid not properly addressed and identified. No bids shall be accepted via facsimile or email.

The opening of bids shall be in the order established by the posted agenda and the agenda shall continue uninterrupted until completion.

Once an item has been reached and any bids on that item has been opened, no other bids on that item will be accepted and any such bid shall be deemed late.

The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap for any position for which the employee or applicant is qualified and that in the event of non-compliance the City may declare the contractor in breach and take any necessary legal recourse including termination or cancellation of the contract.

A bidder filing a bid thereby certifies that no officer, agent, or employee of the City has a pecuniary interest in the bid or has participated in contract negotiations on the part of the City, that the bid is made in good faith without fraud, collusion, or connection of any kind with any other bidder for the same call for bids, and that the bidder is competing solely in his own behalf without connection with, or obligation to, any undisclosed person or firm.

All bids should be submitted with one (1) original and one (1) copy in a sealed envelope, which should read: *YOUR COMPANY NAME* plainly marked on the exterior of the envelope as well as "Bid2018-015 Street Striping."

Should you have any questions, please contact Eric Hindinger, Engineering, 925 Sandy Lane, Warwick, RI at 401-921-9608.

All bids should be written in ink or typed. If there is a correction with whiteout, the bidder must initial the change.

Negligence on the part of the bidder in preparing the bid confers no rights for the withdrawal of the bid after it is open.

Any deviation from the specifications must be noted in writing and attached as part of the bid proposal. The bidder shall indicate the item or part with the deviation and indicate how the bid will deviate from specifications.

The IRS Form W-9 available on www.warwickri.gov should be completed and submitted with the bid if the bidder falls under IRS requirements to file this form.

The successful bidder must furnish a performance and payment bond in the amount of \$10,000.00.

The successful bidder must provide the City of Warwick with an original certificate of insurance for general liability and automobile liability in a minimum amount of \$1 million. The certificate of insurance must name the *City of Warwick as the additional insured* and so stated on the certificate with the bid name and bid number. It is the vendor's responsibility to provide the City of Warwick with an updated certificate of insurance upon expiration of the original certificate.

When a bid is awarded to a corporation, limited liability company or other legal entity, prior to commencing work under the awarded bid, that corporation, company or legal entity may be required to provide to the Purchasing Agent a Certificate of Good Standing dated no more than thirty (30) days prior to the date upon which the bid award was made.

The successful bidder will provide said Certificate of Insurance, Certificate of Good Standing (if required) and Bonds within ten (10) calendar days after notification of award or the City reserves the right to rescind said award.

Failure to provide adequate insurance coverage within the specified duration of time as set forth is a material breach of contract and grounds for termination of the contract.

Prices to be held firm July 20, 2017 through July 19, 2018. Term contracts may be extended for one additional term upon mutual agreement unless otherwise stated.

The contractor must carry sufficient liability insurance and agree to indemnify the city against all claims of any nature, which might arise as a result of his operations or conduct of work.

The City is exempt from the payment of the Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30, Paragraph I, as amended.

The Purchasing Agent reserves the right to reject any and all bids, to waive any minor deviations or informalities in the bids received, and to accept the bid deemed most favorable to the interest of the City.

The successful bidder must comply with all Rhode Island Labor Laws, Chapter 37-12-13, and all other applicable Local, State and Federal Laws.

Prevailing Wages will apply to this bid. Current rates may be viewed at <http://www.dlt.state.ri.us/pw>.

The successful bidder must comply with all Rhode Island Laws applicable the public works projects, including, but not limited to provisions of Chapter 13 of Title 37 of the Rhode Island General Laws, pertaining to prevailing wage rates, and all other applicable local, state and federal laws.

The City reserves the right to terminate the contract or any part of the contract in the best interests of the City, upon 30-day notice to the contractor. The City shall incur no liability for materials or services not yet ordered if it terminates in the best interests of the City. If the City terminates in the interests of the City after an order for materials or services have been placed, the contractor shall be entitled to compensation upon submission of invoices and proper proof of claim, in that proportion which its services and products were satisfactorily rendered or provided, as well as expenses necessarily incurred in the performance of work up to time of termination.

No extra charges for delivery, handling or other services will be honored. All claims for damage in transit shall be the responsibility of the successful bidder. Deliveries must be made during normal working hours unless otherwise agreed upon.

All costs directly or indirectly related to the preparation of a response to this solicitation, or any presentation or communication to supplement and/or clarify any response to this solicitation which may be required or requested by the City of Warwick shall be the sole responsibility of and shall be borne by the respondent.

If the respondent is awarded a contract in accordance with this solicitation and the respondents bid or response and if the respondent fails or refuses to satisfy fully all of the respondents obligations thereunder, the City of Warwick shall be entitled to recover from the respondent any losses, damages or costs incurred by the City as a result of such failure or refusal.

The City reserves the right to award in part or full and to increase or decrease quantities in the best interest of the City.

Any quantity reference in the bid specifications are estimates only, and do not represent a commitment on the part of the City of Warwick to any level of billing activity. It is understood and agreed that the agreement shall cover the actual quantities ordered during the contract period.

The City reserves the right to rescind award for non-compliance to bid specifications.

The successful bidder must adhere to all City, State and Federal Laws, where applicable.

SPECIFICATIONS

The City reserves the right to increase or decrease quantities (distances). The above unit prices shall include all labor, materials, equipment, overhead profit, insurance, etc. to cover the finished work.

PAYMENT: Payment shall be made on actual lengths and quantities of painted lines as measured in the field. Payment shall not be made by this estimated quantity; City reserves the right to reduce any item or quantity of any item deemed necessary.

Inquiries may be directed to Eric Hindinger, Engineering, at Department of Public Works, 925 Sandy Lane, Warwick, Rhode Island, 02889, 401-921-9608.

**STREET LISTING WITH DISTANCE TO BE STRIPED
WILL BE MADE AVAILABLE TO THE SUCCESSFUL BIDDER**

SPECIFICATION FOR REFLECTORIZED PIGMENT PAVEMENT MARKINGS
CHLORINATED RUBBER FAST DRY WHITE AND YELLOW
TO BE APPLIED WITH TRUCK MOUNTED AUTOMATIC MACHINE

SCOPE:

This specifications is intended to cover white and yellow fast drying traffic paint which shall be suitable for application by spray equipment approved by the Department and which will provide adhesive binder for receiving and holding glass beads when applied by the drop-on-method for producing reflectORIZED traffic markings on hard surface pavements of all types.

The vehicle and pigment shall be so prepared and blended that the resulting paint shall be uniform composition and of the required consistency. After storage for periods up to 6 months from date of packaging, the pigment shall not settle badly or cake in the container, nor shall the paint skin or thicken in storage sufficiently to cause an undesirable change in consistency. The paint at the time of use shall comply with all the provisions of this specification and shall be capable of being redispersed with a paddle to a smooth uniform condition.

In addition to the methods of tests and inspection set forth in this specification and the applicable portions of the 2004 Standard Specifications, the Department reserves the right to make any and all additional tests it may seem necessary to determine compliance with these specifications, and the suitability of the paint for its intended usage. The Department further reserves the right to require the manufacturer of the paint to certify to the use of specific materials and components are not readily identifiable in the finished paint. Where reference is made herein to materials specifications and methods of test by citation, it shall mean the current edition of such specifications and methods approved and adopted at the date of receipt of bids.

TYPE:

White fast drying traffic paint, as specified herein, shall be based on vehicle composed of pure drying alkyd, chlorinated rubber and chlorinated paraffin, with appropriate pigments, stabilizers and flow control agents.

PREPARATION OF PAINT

The specified portions of titanium dioxide (agnathous), silicate, zinc oxise, and calcium carbonate shall be dispersed in a suitable amount of vehicle. The grinding shall be performed by either a High R-speed mill, roller mill, pebble mill, or high speed disc disperser similar to those manufactured by Cowles-Morehouse or Hockmeyer. The resultant paste shall have fineness of not less than 4 as determined on Hegman grind gage (Federal Standard NO.141A Method 4411). The remainder of the vehicle, additional thinners and stabilizers, when required, shall then be added to product a paint having the specified consistency. The equipment to be used in the preparation and manufacture of the paint shall be subject to inspection and approval of the Engineer.

PHYSICAL PROPERTIES

- A. **Consistency** - Forty-eight hours after the paint has been prepared and placed in the containers, it shall have a consistency of 70-80 K.U. for use in spray type equipment. Consistency shall be determined according to ASTM Method D-52.

B. **Drying Time** - The paint shall dry in accordance with the following requirements under the conditions indicated.

- i. **Laboratory Test** - The paint shall dry to no-pick up in not more than 5 minutes without glass beads when tested in accordance with ASTM 711-55 except that the film shall be applied at a wet film thickness of .015 inches (15 mils.)
- ii. **Field Test** - The white and yellow reflectorized traffic line, when applied with the striping equipment at the required coverage rate of 100 to 115 square feet per gallon and 6 pounds of beads per gallon of paint shall dry to a no-tracking condition in not more than 180 seconds.

The no-tracking time shall be determined on the traffic lines applied as specified by passing over the lines in a passenger car at a speed of approximately 40 miles per hour and simulating a gradual passing maneuver. The lines shall be considered dry to no-tracking conditions when no visual deposition of paint to the pavement occurs when viewed from a distance of 50 feet.

C. **Flexibility and Adhesion** - A film of paint having a wet film thickness of .015 inches shall be applied with a doctor blade to a tin panel 3 inch c 5 inch weighing 0.39 to 0.51 lbs./sq. ft., previously cleaned with benzene and lightly buffed with steel wool. After drying in a horizontal position at room temperature (70-80 Degree F.) for 18 hours, the coated panels shall be baked in an oven at 122 Degree = 4 Degree F. for 2 hours, removed and allowed to cool to room temperature. It shall then be bent rapidly with the painted surface uppermost over a 1/2" in. diameter mandrel and examined without magnification. The paint shall adhere firmly to the panel and any evidence of cracking or flaking of the film shall be cause for rejection of the paint.

D. **Water Resistance** - A film of paint having a wet film thickness of .015 in. shall be applied with a doctor blade to 4 inc. X 8 in glass plate and allowed to dry in a horizontal position at room temperature (70-80 Degree F.) for 72 hours. Immerse one-half of the painted plate in distilled water at room temperature for 18 hours, allow to air dry for 2 hours and examine. The paint shall adhere firmly to the plate and any evidence of softening or blistering shall be cause for rejection. The glass plate shall be thoroughly cleaned with suitable solvent and dried before application of the paint.

E. **Light Resistance** - The paint shall show resistance to discoloration or dark when tested by the method prescribed by Federal Specification TT-P-115.

WHITE

PAINT COMPOSITION

When tested in accordance with the provision of Federal Test Method Standard No. 141A and applicable methods of test, the finished paint shall consist of:

	<u>Minimum</u>	<u>Maximum</u>
Pigment, % by wt., Method 4021	48.0	50.0
Vehicle, % by difference	50.0	52.0
Wt. /gal., lbs., Method 4164	11.9	
Non-volatile Vehicle, % by weight	41.0	
Total Solids in Paint, % by weight	69.5	

Pigment Composition

Titanium dioxide (ASTMD 476 Type 1 (anatase)	34.0	36.0
Magnesium silicate ASTM D605	30.0	32.0
Calcium carbonate ASTM D 1199 Type GS, Grade 1	25.0	27.0
Zinc Oxide ASTM D 7944	8.0	10.0

YELLOW

COLOR

The color shall match color chip No. 13538, of the Federal Standard Specification 595a.

PAINT COMPOSITION

When tested in accordance with the provisions of Federal Test Method Standard No. 141A and applicable methods of test, the finished paint shall consist of:

	<u>Minimum</u>	<u>Maximum</u>
Pigment, 0/0 by wt., Method 4021	50.0	52.0
Vehicle, 0/0 by difference	48.0	50.0
Wt./gal., Method 4184	12.4	
Non-Volatile Vehicle, 0/0 by weight	40.5	
Total Solid in Paint, 0/0 by weight	70.5	

PIGMENT COMPOSITION

Medium Chrome yellow (ASTM D 211 Type III)	34.0	36.0
Magnesium Silicate (ASTM D 605)	11.0	13.0
Calcium Carbonate(ASTM D 1199 Type GC Grade II)	53.0	55.0

STABILIZER COMPOSITION

Anti-setting Agent shall be added - 2lbs. to each 100 gallon of finished paint.

Anti skinning Agent shall be added - 3 lbs. to each 100 gallons of finished paint.

Chlorinated Rubber Stabilizer shall be propylene oxide or epichlorhydrin. This is to be added to the finished paint just before closing and sealing of the drum. The proportion shall be 2% weight of propylene oxide or epichlorohydrin based on the chlorinated rubber.

VEHICLE COMPOSITION

The vehicle shall consist of medium drying oil phthalic alkyd resin, chlorinated paraffin, chlorinated rubber and methyl ethyl ketone. The vehicle, as separated from the pigment, shall show non-volatile content of at least 41.0% Formulation of the vehicle, excluding solvent, shall be as follows:

42% Alkyd Resin Solution
33% Chlorinated Rubber
25% Chlorinated Paraffin

Alkyd Resin Solution - medium drying oil phthalic alkyd containing 33 to 37% phthalic anhydride and 48 to 55% oil acids based on the solid resin, or linseed oil or mixture of the two, with the fatty acids have an iodine value to 115 minimum and an acid number 8 maximum. No recovered oils or fatty acid derivatives shall be used. No oils other than the above or resin shall be present.

The alkyd resin solution shall be supplied at 60% + 1% solids in VM & P naphtha. The resin shall be X70VTI (Sherwin-Williams), Bechkosol P-810-60 solution must tolerate 500% dilution with VM & P naphtha. A solution containing 100 grams of 20 cp. Parlon, 130 grams of 60% alkyd solution, and 290 grams of methyl ethyl ketone shall be clear, transparent and show no separation after 24 hours storage in a 3/4 full test tube at 80 + 5 F.

The alkyd resin, at 45% solids basis (reduced from 60% with VM & P naphtha) shall have a Gardner color of 9 maximum and a viscosity (Gardner) of D to G. A cast film of the alkyd, 3 mils thick, shall set to touch in not more than 90 minutes.

Phthalic anhydride shall be determined in accordance with Federal Standard No. 141A, Method 7021 or ASTM D 1307.

Oil acids shall be determined in accordance with Federal Standard No. 141A, Method 7103.

Iodine number of fatty acids shall be determined in accordance with Federal Standard No. 141A, Method 5061.

Chlorinated Rubber shall have the following properties:

Fixed Chlorine, 65% minimum

Color (Gardner), 20% by wt. in toluene 4 max.

Viscosity (20% by wt. in toluene) 9-25 cps.

Chlorinated Paraffin shall comply with Mil.-C-429A.

The chlorinated paraffins should be Clorafin 40 (Hercules Incorporated), Chlorowax 40 (Diamond), Cereclor 42 (I.C.I.) or approved equal.

Methyl Ethyl Ketone The methyl ethyl ketone shall meet the requirements of ASTM designation D 740.

Driers shall be 0.06% cobalt (metal) and 1.0% lead (metal) based on resin solids.

Packaging and Labeling

The paint shall be packaged in 5-gallon kits or 55-gallon drums complying with the Code of Federal Regulations revised 1-65 as may be directed by purchaser and as provided elsewhere in the proposal. The 5 gallon kits shall be new metal, 37A30, "Single Trip Containers", lug type, 24 gauge steel for both body and head sheet. Container and lid must be stamped with the marking required in said specifications.

The 55-gallon drums shall be made from not less than 18 gauge metal for both body and head and have welded side seams. The drums shall be of the open-end type and all containers, after being filled, shall be closed with a tight fitting cover that will assure a leak-proof seal.

The label shall show the name of the manufacture, a designation of the contents, the lot or batch number, the date of manufacture and the volumetric contents in U.S. gallons. All containers shall be labeled in accordance with I.C.C. Standard Regulations for flammable material.

APPLICATION REQUIREMENTS

THINNING

When this point is applied without heating, it may be thinned with methylene chloride to proper application consistency. No other thinner shall be used.

SOLVENTS FOR CLEANING

For cleaning equipment, methylene chloride, toluene, xylene, or proprietary blends of aromatic hydrocarbons having Kauri-Butanol values above 78 shall be used.

COVERAGE AND BEAD APPLICATION

To comply with the requirements of successful application, the pigmented binder, when sprayed at a wet film thickness of approximately 15 mils at a temperature of 110 F., shall have a coverage rate of not less than 100 nor more than 115 square feet per gallon. Glass beads shall be applied at the rate of approximately 6 pounds per gallon onto and into the binder application, but in one operation, so as to produce satisfactory adhesion, refraction and reflection in the required no-pick-up time.

PAINT APPLICATION TEMPERATURE

Paint striper shall be equipped with heaters to deliver paint at 110°-130° F, and proper mixing equipment so that tank temperature will be uniform throughout.

METHOD OF MEASUREMENT

"Pavement Markings" will be measured by the linear foot of material (excluding skips and spaces in the widths shown on the plans complete in place and accepted.)

BASIS OF PAYMENT

"Pavement Markings" will be paid for at the contract unit price per linear foot, complete in place and accepted, which price shall constitute full compensation for layout, furnishing and applying the pavement workings, and for all labor, equipment, tools, materials and incidentals necessary to protect the operation from traffic and complete the item of work to the satisfaction of the Engineer.

ALTERNATE YELLOW

COLOR

The color shall match color chip No. 34538 of the Federal Standard Specification 595a.

PAINT COMPOSITION

When tested in accordance with the provisions of the Federal Test Method Standard No. 14A and applicable methods of test, the finished paint shall consist of:

	<u>Minimum</u>	<u>Maximum</u>
Pigment 0/0 by wt., Method 4021	50.0	54.0
Vehicle 0/0 by difference	46.0	50.0
Height/gal., lbs., Method 4184	11.0	
Non-Volatile Vehicle, 0/0 by weight	40.5	
Total Solids in Paint, 0/0 by weight	70.5	

PIGMENT COMPOSTION

*ONCOR Y47A	33.0	35.0
Magnesium Silicate (ASTM D605)	24.0	26.0
Calcium Carbonate (ASTM D 1199 Type GC Grade II	29.0	31.0
Zinc Oxide ASTM D 7944	8.0	3.0
Titanium Dioxide ASTM D 476 - Type I	4.0	4.8

**NOTE: The yellow-pigmented binder shall, upon chemical analysis of the extracted pigment, show not less than 1.5 pounds per gallon of yellow pigment.

The yellow pigment shall be normal lead silico chromate (a color chip 33538 will permit) conforming to the following specifications:

Normal Lead Silico Chromate	<u>Minimum</u>	<u>Maximum</u>
Specific Gravity	3.8	
Weight Per gallon	31.6	
Oil Absorption g. per 100 g.	14.0	17.0
Average particle size	6 microns	

	<u>Minimum</u>	<u>Maximum</u>
Percent retained on 325 sieve		0.30
Percent lead oxide (PH)	31.5	
Percent Chromate Trioxide (CrO3)	14.0	15.7
Silica, Silicates and Carbonates		Balance

PAINT, TRAFFIC, YELLOW, FAST DRYING ALTERNATE

MANUFACTURERS SUGGESTED BATCH WEIGHT

	<u>POUNDS</u>
Parlon S20	100
Medium oil length soybean alkyd (60% non-volatile)	130
Clorafin 40	75
ONCOR Y47A	200
Titanium dioxide (anatase)	25
325-mesh talc	150
Lead-free zinc oxide	50
Calcium carbonate	180
Bentone (1) 38	2
Methyl Alcohol	5
24% Lead naphthenate	2
6% Cobalt	1
Anti-skinning agent	3
Epichlorohydrin	3
Methyl amyl acetate	35
Methyl ethyl Ketone	<u>265</u>
Total	1226

M. 17.02.1 GLASS BEADS

Delete Section M.17.02.1 from the Standard Specifications for Road and Bridge Construction and substitute the following:

A. SCOPE:

This specification covers the requirements for glass beads which are to be dropped on white and yellow traffic paint so as to produce a highly weather and wear resistant reflectorized traffic marking.

B. GENERAL:

The beads shall be transparent, clean colorless glass, smooth and properly shaped: and shall have no milkiness nor contain any air bubbles which could affect the functional requirements for the beads.

C. DETAILED REQUIREMENTS:

1. **GRADATION:** When tested by method provided in ASTM D1214 (By use of U.S. Standard Sieves), the graded sizes of the beads shall be as follows:

<u>SIZES OF SIEVES</u>	<u>PERCENT OF WEIGHT PASSING THROUGH</u>
#20	100% min.
#30	75-95
#50	15-35
#80	0-5

2. **ROUNDNESS:** When tested by method provided in ASTM D1155 (Procedure A) to the beads shall contain a minimum of 75% true spheres.
3. **CRUSHING RESISTANCE:** When tested by method provided in A.S.T.M. D1213 (By use of U.S. Standard Sieves), the minimum crushing resistance of the beads shall be:

Beads retained on #30 Sieve - 40 pounds
Beads passing #30 Sieve that are retained on
#40 Sieve - 30 pounds

4. **MOISTURE RESISTANCE:** When tested by the following procedure, the beads shall flow freely. After placing 100 grams of beads in a 500-ml. beaker, lightly pour into the beaker enough distilled water to cover the beads to a height of one inch above the beads. Then allow the beaker and contents to stand, vertically and undisturbed for a period of five minutes, after which carefully pour out the water, place the beads in a clean, dry beaker and allow this beaker and contents to stand, vertically and undisturbed for another period of five minutes.

Then pour the beads into a standard laboratory glass funnel with a five-inch diameter and having a stem four-inches in length, a stem entrance opening of 7/16 inch inside diameter. The funnel may be lightly tapped, if necessary, to start the flow of beads.

5. **REFRACTIVE INDEX:** When tested by a liquid immersion method (Becks Line Method or equal) at a temperature of 77 Deg. F., the beads shall have an index of refraction of 1.50-1.65.
6. **PACKAGING:** The beads shall be furnished in 60 pounds lots packaged in polyethylene-lined burlap bags or equal container, such container guaranteed to furnish dry and undamaged beads. The following information shall be indelibly marked in a clear and legible manner on the face of each container.

- (a) The Name of the Manufacturer
- (b) The Place of Manufacturer
- (c) The Words: "Glass Beads - Traffic"
- (d) The Term: "R.I.D.O.T. T.M. 17.02"
- (e) The Date of Manufacturer (month and year)

THERMOPLASTIC TRAFFIC LINE - YELLOW

DESCRIPTION:

This specification covers a yellow reflectorized pavement marking material of the same type as described in Rhode Island specification for Thermoplastic Traffic Line - White. All requirements for the materials described in Rhode Island specifications for Thermoplastic Traffic Line - White, shall apply except for the following:

REQUIREMENTS:

The pigment, beads and filler shall be uniformly dispersed in the resin. The material shall be free from all skins, dirt and foreign objects and shall comply with requirements according to Table I.

TABLE I - COMPOSITION

<u>COMPONENT</u>	<u>YELLOW</u>
Binder	20.0
Glass Beads	20.0
Yellow Pigment, Calcium Carbonate and Inert Fillers	*Note

***NOTE:** Amount and type of yellow pigment, calcium carbonate and inert fillers shall be at the option of the manufacturer providing all other requirements of this specification are met.

The other ingredients shall meet the following specifications:

Titanium Dioxide	ASTM DA78, Type I
Calcium Carbonate	ASTM D1199, Grade II

Color: The thermoplastic material after heated for four hours at 425 F. and cooled to 77 F. shall meet the Following:

Yellow Daylight reflectance at 45 F. - o F. ...55% minimum. Shall match Federal Test Standard No. 535 Color 33538.

Flowability: Maximum percent residue to 21.

Yellowness Index: Does not apply

METHOD OF MEASUREMENT:

Same as THERMOPLASTIC TRAFFIC LINE - WHITE

BASIS OF PAYMENT:

Same as THERMOPLASTIC TRAFFIC LINE - WHITE

THERMOPLASTIC TRAFFIC LINE - WHITE

DESCRIPTION:

This specification covers a white reflectorized pavement striping material of the type that is applied to a road surface in a molten state by mechanical means with a surface application of glass spheres. When applied properly and at the designated thickness and width, the strips shall, upon cooling, be reflectorized and be able to resist deformation by traffic. At the time of application, all pavement surface shall be free of oil, dirt, dust, grease, old paint and similar foreign materials. The cost of removing these contaminants shall be included in the bid price of this item.

The thermoplastic material shall be homogeneously composed of pigment, filler, resins, and glass reflectorizing spheres. The thermoplastic material shall be available in both white and yellow.

MATERIALS:

The vendor shall have the option of formulating the material according to his own specifications. However, the physical and chemical properties contained in this specification shall apply regardless of the type of formulation used. The material, upon heating to the application temperature, shall not exude fumes which are toxic, or injurious to persons or property.

Thermoplastic Traffic Line Material shall be on the Department's approved lists of materials.

Glass beads (pre-mix) shall be free from air inclusions:

Refractive Index	1.50 minimum
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Spheres	90 Minimum
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Gradation:

<u>Sieve Size</u>	<u>Passing</u>
#40	95% Minimum
#70	15% Maximum

The beads used in the formulation shall be smooth, clear and free from air inclusions and scratches that might affect their function as reflecting media.

The beads used for drop-on application shall conform to the Rhode Island Department of Transportation specifications M-17-02.1 as included in these special provisions.

REQUIREMENTS:

Specific Gravity

The specific gravity of the white thermoplastic traffic line material shall not exceed 2.15.

Composition

The pigment, beads, and filler shall be uniformly dispersed in the resin. The material shall be free from all skin, dirt and foreign objects and shall comply with requirements according to Table I.

TABLE I - COMPOSITION

<u>COMPONENT</u>	<u>WHITE</u>
Binder	20.0 min.
Glass Beads	20.0 min.
Titanium Dioxide (ASTM DA76, Type I)	10.0 min.
Calcium Carbonate & Inert Filler (ASTM D1199 Grade II)	48.0 max.

Physical Characteristics

Color

The thermoplastic material after heating for four hours at 425F. and 77 F. shall meet the following:

White Daylight reflectance at 45 F. - 0 F ...75%

Drying Time

When applied at a temperature range of 400 F.-425 F. and thickness of 1/8-inch to 3/16 inch, the material shall set to bear traffic without tracking or deformation in not more than two minutes when the air temperature is 50 F. and not more than ten minutes when the air temperature is 90 F.

Bond Strength

After heating the thermoplastic material for four hours at 425 F., the bond strength to portland cement concrete shall exceed 180 PSI.

Cracking and Resistance at Low Temperature

After heating the thermoplastic material for four hours at 425 F., applied and cooled at 15 F + 3 F. shall show no cracks.

Impact Resistance

After heating the thermoplastic material for four hours at 425 F and tested, the impact resistance shall be a minimum of 10-inch pounds.

Softening Point

After heating the thermoplastic material for four hours at 425 F. and tested, in accordance with ASTM-E-28, the material shall have a softening point of 185 F. to 215 F.

Flowability

After heating the thermoplastic material for four hours at 425 F. and tested for flowability, the white thermoplastic shall have a maximum percent residue of 18.

Yellowness Index

The white thermoplastic material shall not exceed a yellowness index of 0.12.

Extended Heating Flowability

After testing the thermoplastic material in accordance with Section 1.2.10 of AASHTO T-250, the materials shall conform with the following - Flowability, percent residue maximum 28.

Storage Life

The material shall not meet the requirements of this specification for a period of one year. The thermoplastic must also wait uniformly with no evidence of skin, or unmelted particles for this one year time period. Any material not meeting the above requirements, shall be replaced by the manufacturer.

CONSTRUCTION METHODS:

The thermoplastic material shall readily extrude at temperature between 400 F - 425 F. from the approved equipment to produce a cross-section of line 1/8 inch to 3/18-inch thick which shall be continuous and uniform in shape, have a clear and sharp dimension.

The material shall not exude fumes which are toxic, obnoxious or injurious to persons or property when it is heated during application.

The application of additional glass beads by the drop-on method shall be at the rate of .08 pounds per square foot of marking.

Equipment General

Thermoplastic applying equipment shall be approved by the Program Manager prior to the start of work.

For heating the thermoplastic composition, the application equipment shall include a melting kettle (s) of such capacity as to allow for continuous marking operations.

The kettle (s) shall be mounted on a separate "Supply" vehicle.

- Application equipment shall be constructed to provide continuous mixing and agitation of material. Conveying parts of the equipment between the main material reservoir and the extrusion shoe(s) shall be so constructed as to prevent accumulation and clogging. All parts of the equipment which come into contact with the material shall be so constructed as to be easily accessible and exposable for cleaning and maintenance. The equipment shall be constructed so that all mixing and conveying parts up to and including the extrusion shoe(s), maintain the material at the required plastic temperature.
- The applying equipment shall be so constructed as to insure continuous uniformity in the dimension of the stripe. The applicator shall provide a means for cleanly cutting off stripe ends squarely and shall provide a method of applying "skip" lines. The equipment shall be capable of applying varying widths of traffic markings.
- The applicator shall be equipped with a drop-on type bead dispenser capable of uniformly dispensing reflective glass spheres at controlled rates of flow.
- The bead dispenser shall automatically operate in such a manner that it will only dispense beads while the composition is being applied.
- Applying equipment shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc.
- The equipment used for the placement of thermoplastic pavement markings shall be two general types: mobile applicator and portable applicator.

Mobile Applying Equipment

The mobile applicator shall be defined as a truck mounted, self-contained pavement marking machine that is capable of hot applying thermoplastic by the extrusion method. The unit shall be equipped to apply the thermoplastic material at temperatures of from 400 F, and at the widths and thicknesses specified herein. The mobile unit shall be equipped with an extrusion shoe (s), and

shall be capable of marking edgeline and centerline stripes. The extrusion shoe (s) shall be closed, heat jacketed or a suitably insulated unit; shall hold the molten thermoplastic at a temperature of from 400 F. to 425 F.; and shall be capable of extruding a line of from 3 to 8 inches in width; and at a thickness of not less than 1/8 inch nor more than 3/16-inch, and of generally uniform cross-section.

Material temperature gauges shall be affixed or incorporated in the extrusion shoe in such a manner as to be visible, and capable of monitoring the composition temperature throughout the working operation. The mobile unit shall be equipped with a electronic and programmable line pattern control system, or mechanical control system, so as to be capable of applying skip or solid lines in any sequence, and through any extrusion shoe in any cycle length.

Portable Applying Equipment

The portable applicator shall be defined as hand operated equipment, specifically designed for placing thermoplastic installation such as crosswalks; stop bars; legends; arrows; and short lengths of lane, edge and centerlines. The portable applicator shall be capable of applying thermoplastic pavement markings by the extrusion method. It is intended that the portable applicator will be loaded with hot thermoplastic composition from the melting kettle (s). The portable applicator shall be equipped with all the necessary components, including a materials storage reservoir, bead dispenser, extrusion shoe, and heating accessories, so as to be capable of holding the molten thermoplastic at a temperature of from 400 F. to 425 F., of extruding a line of from 3 to 8 inches in width, and in thickness of not less than 1/8-inch not more than 3/16-inch, and of generally uniform cross-section. Material temperature gauges shall be affixed or incorporated in the placed upon dry pavement surfaces. At the time of installation, the pavement surface temperature shall be minimum of 50 F. and rising.

Option

In the event that the surface temperature is 45 F. and rising the contractor may choose to apply thermoplastic pavement marking material provided that the surface is dry and the contractor accepts all responsibility for the performance of thermoplastic line striping for a period of one year from the date of application. The contractor shall submit his request in writing to the engineer for approval.

Replacement of any thermoplastic material which fails for any reason during this one-year period shall be replaced by the contractor at his own expense.

No payment will be made for the quantity of material placed at surface temperatures below 50 F. for the period of one year.

PACKAGING AND MARKING

The thermoplastic traffic line material shall be packaged in suitable containers to which it will not adhere during shipment or storage. The package shall weight approximately 50 pounds.

Each container label shall designate the color, manufacturer's name, batch number and date of manufacture. Each batch manufactured shall have its own separate number. The label shall warn the user that the material shall be heated in the range of 400 F. - 425 F. during application.

The Contractor shall assume all costs arising from the use of the patented materials, equipment, devices, or processes and save harmless the purchaser and its duly authorized representatives from all suits at law or action of every nature for, or on account of the use of any patented materials, equipment, devices, or processes.

METHODS OF SAMPLING AND TESTING

The minimum size batch of thermoplastic traffic striping materials samples and tested shall not be less than 3,000 pounds unless the total order is less than this amount. Any manufacturer not familiar with the technique of making this material should consult the purchase. A small trial batch should be made prior to making the thermoplastic traffic line in large quantities to make certain the finished product will comply with all the requirements of this specification.

The material shall be tested in accordance with the appropriate method in Federal Test Method Standard No. 141 appropriate ASTM or AASHTO designation.

PRIMER

The primer for portland cement concrete roads shall consist of between 60/40 and a 70/30 ratio of Buto N. rubber phenolic resin dissolved in volatile organic solvents. The solids content or the primer shall be not solvents. The solids content of the primer shall be not less than 10%. A one mil film of this material shall dry at 70 F. and 60% RH in less than five minutes.

METHOD OF MEASUREMENT

"Pavement Markings" will be measure by the linear foot of materials (excluding skips and spaces) in the width show on the plans complete in place and accepted.

BASIS OF PAYMENT

"Pavement Markings" will be paid for at the contract unit price per linear foot, complete in place and accepted which price shall constitute full compensation for layout, furnishing and applying the pavement markings, and for all labor, equipment, tools, materials, and incidentals necessary to protect the operator from traffic and complete the item of work to the satisfaction of the Engineer.

"Thermoplastic Characters and Figures" will be paid for at the Contract Unit price per "each", complete in place and accepted at locations as directed by the Engineer.

CITY OF WARWICK

BID AND CONTRACT FORM

TITLE OF SPECIFICATION: Bid2018-015 Street Striping

I. BID:

WHEREAS, the CITY OF WARWICK has duly asked for bids for performance of services and/or supply of goods in accordance with the above-indicated specifications.

The person or entity below does irrevocably offer to perform the services and/or furnish the goods in accordance with the specifications, which are hereby incorporated by reference in exchange for the bid price below;

This offer shall remain open and irrevocable until the CITY OF WARWICK has accepted this bid or another bid on the specifications or abandoned the project.

The bidder agrees that acceptance below by the CITY OF WARWICK shall transform the bid into a contract. This bid and contract shall be secured by Bonds, if required by the specifications.

Pricing as Submitted

Bid2018-015 Street Striping Pricing Sheet

<u>Item #</u>	<u>Description</u>	<u>Distance</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	4' Reflectorized Pigment Pavement Markings/White for Street Edges	250,000 LF	\$	\$
2	4' Reflectorized Pigment Pavement Markings/Yellow, for Street Center Line	350,000 LF	\$	\$
3	4' Reflectorized Pigment Pavement Markings/Skip White	35,000 LF	\$	\$
4	12' White Thermoplastic Crosswalk & Stop Bars	1,500 LF	\$	\$
5	6' Thermoplastic Characters (A character refers to a single letter or number)	50 EA	\$	\$
6	4' Thermoplastic Figures (Running Boy)	2 EA	\$	\$
7	6' Thermoplastic Figures (Running Boy)	2 EA	\$	\$
8	4" (18' Long) Parking Stalls to Include Layout	1,600 LF	\$	\$
9	Handicap Parking Markings (Per ADA Regs.)	10 EA	\$	\$
			Bid Total	\$