

**AMENDMENT TO AGREEMENT
CITY OF LINCOLN
ANNUAL SUPPLY FOR THERMOPLASTIC MOLTEN PAVEMENT MARKING MATERIAL
BID NO. 11-057
THIRD AND FINAL RENEWAL**

This Amendment is hereby entered into on this 27th day of February, 2014 by and between Ennis Traffic (hereinafter "Contractor") and City of Lincoln (hereinafter "City"), for the purpose of amending an Agreement dated April 27, 2011, under E. O. No. 84008, (the "Agreement"), for the **Annual Supply for Thermoplastic Molten Pavement Marking Material, Bid No. 11-057**, which is made a part hereof by this reference:

WHEREAS, the original term of the Agreement is April 27, 2011 through April 26, 2012, with the option to renew for three (3) additional one (1) year terms upon written mutual consent of both parties; and

WHEREAS, the Agreement was amended by the City to renew the agreement for an additional one year period from April 27, 2012 through April 26, 2013,

WHEREAS, the Agreement was amended by the City to renew the agreement for an additional one year period from April 27, 2013 through April 26, 2014,

WHEREAS, the parties wish to renew the agreement for an additional one (1) year term beginning April 27, 2014 through April 26, 2015; and

NOW, THEREFORE, IN CONSIDERATION of the mutual covenants stated herein the parties agree as follows:

- 1) The term of the Agreement shall be from April 27, 2014 through April 26, 2015.
- 2) All other terms of the Agreement, not in conflict with this Amendment, shall remain in full force and effect.

The Parties do hereby agree to all the terms and conditions of this Amendment. This Amendment shall be binding upon the parties, their heirs, administrators, executors, legal and personal representatives, successors, and assigns.

IN WITNESS WHEREOF, the Parties do hereby execute this Amendment.

Official City Use Only

Dated this <u>7th</u> day
of <u>March</u> 2014
 <hr/> Public Works & Utilities Director

Supplier, please fill in the date and following information and mail back to our office; a faxed copy is not acceptable.

Company Name: (PLEASE PRINT)	Ennis Paint, Inc.
By: (PLEASE PRINT)	Dane Alsabrook
By: (PLEASE SIGN)	
Title:	Assistant Vice President
Company Address: (PLEASE PRINT)	115 Todd Ct., Thomasville, Nc 27360
Company Phone & Fax: (PLEASE PRINT)	(336) 475-6600 (336) 475-7900 FAX
E-Mail Address: (PLEASE PRINT)	contracts@ennistraffi.com
Date: (PLEASE PRINT)	2/27/2014

EO 85844

**AMENDMENT TO AGREEMENT
CITY OF LINCOLN
ANNUAL REQUIREMENTS FOR THERMOPLASTIC MOLTEN PAVEMENT
MARKING MATERIAL
BID NO. 11-057
SECOND RENEWAL**

This Amendment is hereby entered into on this 11th day of March, 2013 by and between **Ennis Traffic Safety Solutions, PO Box 404, Ennis, TX 75120** (hereinafter "Contractor") and **City of Lincoln** (hereinafter "City"), for the purpose of amending an Agreement dated April 27, 2011, under E. O. No. 84008, (the "Agreement"), for **The Annual Requirements for Thermoplastic Molten Pavement Marking Material, Bid No. 11-057**, which is made a part hereof by this reference.

WHEREAS, the original term of the Agreement is April 27, 2011 thru April 26, 2012, with the option to renew for three (3) additional one (1) year terms upon written mutual consent of both parties; and

WHEREAS, the parties wish to extend the agreement for an additional one (1) year term beginning April 27, 2013 thru April 26, 2014; and

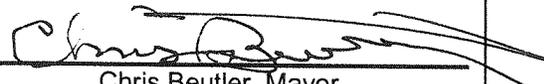
NOW, THEREFORE, IN CONSIDERATION of the mutual covenants stated herein the parties agree as follows:

- 1) The term of the Agreement shall be from April 27, 2013 thru April 26, 2014.
- 2) All other terms of the Agreement, not in conflict with this Amendment, shall remain in full force and effect.

The Parties do hereby agree to all the terms and conditions of this Amendment. This Amendment shall be binding upon the parties, their heirs, administrators, executors, legal and personal representatives, successors, and assigns.

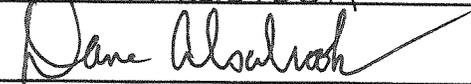
IN WITNESS WHEREOF, the Parties do hereby execute this Amendment.

Official City Use Only

Dated this <u>11th</u> day of <u>March</u> 2013  Chris Beutler, Mayor

Supplier, please fill in the date and following information and mail back to our office; a faxed copy is not acceptable.

Executed this _____ day of _____, 2013

Company Name: (PLEASE PRINT)	Ennis Paint, Inc.
By: (PLEASE PRINT)	Dane Alsbrook
By: (PLEASE SIGN)	
Title:	Assistant Vice President
Company Address: (PLEASE PRINT)	PO Box 404 Ennis TX 75120
Company Phone & Fax: (PLEASE PRINT)	(800) 331-8118 (336) 475-7900
E-Mail Address: (PLEASE PRINT)	contracts@ennistraffic.com

Amendment to Agreement for Annual Requirements for Thermoplastic Molten Pavement Marking Material Agreement for the City - First Renewal with Price Increase

This Amendment is hereby entered into on this 19 day of March, 2012, by and between **Ennis Traffic Safety Solutions, PO Box 404, Ennis, TX 75120** (hereinafter "Contractor") and **City of Lincoln** (hereinafter "City"), for the purpose of amending an Agreement dated April 27, 2011, under E. O. No. 84008, (the "Contract"), for **The Annual Requirements for Thermoplastic Molten Pavement Marking Material, Bid No. 11-057**, which is made a part hereof by this reference.

WHEREAS, the original term of the Agreement is April 27, 2011 thru April 26, 2012, with the option to extend for three (3) additional one (1) year periods upon written mutual consent of both parties; and

WHEREAS, the parties wish to renew the first (1st) of three (3) annual renewals to the agreement for an additional one (1) year term beginning April 27, 2012 thru April 26, 2013; and

WHEREAS, the parties wish to amend the agreement to reflect a **price increase** for the new term of the agreement as per **Attachment A**; and

NOW, THEREFORE, IN CONSIDERATION of the mutual covenants contained in the Contract, under City Executive Order No. 82507, and stated herein the parties agree as follows:

- 1) The Agreement shall be renewed for an additional one (1) year term beginning April 27, 2012 thru April 26, 2013.
- 2) The parties agree that the Owners will pay the revised pricing for the items listed in **Attachment A**, which is attached hereto and made a part hereof by this reference.
- 3) All other terms of the Contract, not in conflict with this Amendment, shall remain in full force and effect.

The Parties do hereby agree to all the terms and conditions of this Amendment. This Amendment shall be binding upon the parties, their heirs, administrators, executors, legal and personal representatives, successors, and assigns.

IN WITNESS WHEREOF, the Parties do hereby execute this Amendment.

Official City Use Only

Dated this <u>19</u> day
of <u>April</u> 2012
 Chris Beutler, Mayor

Supplier, please sign and date. Mail back to our office; a faxed copy is not acceptable.

Dated 3/19/2012

Company Name: (PLEASE PRINT)	Ennis Paint Inc. dba Ennis Traffic Safety Solutions
By: (PLEASE PRINT)	Dane Alsbrook
By: (PLEASE SIGN)	
Title:	Asst. Vice President
Company Address: (PLEASE PRINT)	P.O. Box 404, Ennis Tx. 75120
Company Phone & Fax: (PLEASE PRINT)	800-331-8118 fax-800-555-0217
E-Mail Address: (PLEASE PRINT)	contracts@ennistraffic.com



March 6, 2012

City of Lincoln
440 South 8th Street
Suite 200, Southwest Wing
Lincoln, Nebraska 68508
Attn: Sharon Mulder

RE: Contract, Bid #11-057 Annual Requirements for Thermoplastic Molten Pavement Marking Material

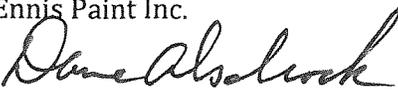
Dear Ms. Mulder,

In response to your interest in renewing the current contract for Thermoplastic Molten pavement marking material, Ennis Paint Inc. is unable to renew your current contract without a price adjustment being considered. There were two industry increases (June 2011 \$350 and Jan 2012 \$150 per ton) for rosin esters and TiO₂ pigments since this contract bid in 2011. We offer to absorb 50% of the increase if the city would adjust the price from \$1350 per ton to an increase of \$250 or \$1600 per ton for the 2012 term.

We feel this offer is best to continue supply while avoiding the expense of offering another bid and securing a contract before the season begins. Ennis Paint Inc. appreciates your business and we look forward to many more years of supplying you with your road marking needs.

If you have any questions or concerns, please do not hesitate contacting me directly at 214-874-7202 or dane@ennistraffic.com.

Best Regards,
Ennis Paint Inc.


Dane Alsabrook
Director of Government Sales

Attachments

July 2011 customer letter

Jan. 2012 customer letter



June 1, 2011

Dear valued customer:

2011 continues to be a tough year across our industry. As we communicated earlier this year, we expect raw materials to remain tight with upward pressure on pricing. This expectation has become reality as critical raw materials utilized in thermoplastic, traffic paint, and plural components continue to rise in price. We have worked diligently to mitigate these costs, but to ensure we have raw materials available to manufacture finished products; we have had to secure these products at higher prices. We cannot absorb these costs long term and must pass a portion along. However, we understand there is business you have secured based on current pricing, therefore we will be holding our prices *on orders currently in our system* until July 1, 2011. *Any previous quotes without an order are considered null and void and will require a replacement quote.*

Effective July 1, 2011, Ennis Traffic Safety Solutions will increase the price of the following products.

Waterbased Traffic Paint	\$1.25 per gallon
Solvent Based Traffic Paint	\$1.25 per gallon
Plural Components (HPS Series)	\$1.50 per gallon
Thermoplastic	\$350 per ton

Thank you for your understanding. If you have any further questions, please contact your Regional Sales Manager.

Sincerely;

M. John Midea
President and Chief Operating Officer



December 1, 2011

Dear valued customer;

As we have communicated throughout 2011, availability of raw materials has been more stable than 2010, however, pricing remains volatile. This is particularly true for TiO₂ and resins for traffic paint, thermoplastic, and plural components. Despite our ongoing efforts to contain these costs, market conditions continue to move the prices upward.

As a result of these rising costs, Ennis Traffic is announcing the following increases on the 30 day price for shipments on or after January 1, 2012.

- Traffic Paint = \$0.45 per gallon
- Thermoplastic = \$150 per ton
- Plural Components (HPS 2-7) = \$1.00 per gallon
- Raised Pavement Markers = \$0.05 per unit

We understand the hardship this causes, but hope that by announcing early you can make the necessary adjustments. We encourage you to remain vigilant in your bidding as the raw materials in these products remain volatile.

Thank you for your understanding. If you have any further questions, please contact your Regional Sales Manager.

Sincerely;

Matthew J. Midea
President and Chief Operating Officer

EO 84008

CONTRACT DOCUMENTS

**CITY OF LINCOLN
NEBRASKA**

**ANNUAL REQUIREMENTS
FOR
THERMOPLASTIC MOLTEN PAVEMENT MARKING MATERIAL
BID NO. 11-057**

**Ennis Traffic Safety Solutions
PO Box 404
Ennis, TX 75120
800.331.8118 x7235**

**CITY OF LINCOLN
CONTRACT AGREEMENT**

THIS CONTRACT, made and entered into this _____ day of _____ 2011, by and between **Ennis Traffic Safety Solutions, PO Box 404, Ennis, TX 75120**, hereinafter called "Contractor", and the City of Lincoln, Nebraska, a municipal corporation, hereinafter called "City".

WHEREAS, the City has caused to be prepared, in accordance with law, Specifications, Plans, and other Contract Documents for the Work herein described, and has approved and adopted said documents and has caused to be published an advertisement for and in connection with said Work, to-wit:

For providing **Annual Requirements for Thermoplastic Molten Pavement Marking Material, Bid No. 11-057** and,

WHEREAS, the Contractor, in response to such advertisement, has submitted to the City, in the manner and at the time specified, a sealed Proposal/Supplier Response in accordance with the terms of said advertisement; and,

WHEREAS, the City, in the manner prescribed by law has publicly opened, read aloud, examined, and canvassed the Proposals/Supplier Responses submitted in response to such advertisement, and as a result of such canvass has determined and declared the Contractor to be the lowest responsible bidder for the said Work for the sum or sums named in the Contractor's Proposal/Supplier Responses, a copy thereof being attached to and made a part of this Contract;

NOW, THEREFORE, in consideration of the sums to be paid to the Contractor and the mutual covenants herein contained, the Contractor and the City has agreed and hereby agree as follows:

1. The Contractor agrees to (a) furnish all tools, equipment, supplies, superintendence, transportation, and other accessories, services, and facilities; (b) furnish all materials, supplies, and equipment specified to be incorporated into and form a permanent part of the complete work; (c) provide and perform all necessary labor in a substantial and workmanlike manner and in accordance with the provisions of the Contract Documents; and (d) execute and complete all Work included in and covered by the City's award of this Contract to the Contractor, such award being based on the acceptance by the City of the Contractor's Proposal, or part thereof, as follows:

Agreement to full proposal

2. The City agrees to pay to the Contractor for the performance of the Work embraced in this Contract, the Contractor agrees to accept as full compensation therefore, the following sums and prices for all Work covered by and included in the Contract award and designated above, payment thereof to be made in the manner provided by the City:

City will pay for products/service, according to the Line Item pricing as listed in Contractors Proposal/Supplier Response, a copy thereof being attached to and made a part of this Contract. The City shall order on an as needed basis for the duration of the contract.

3. Equal Employment Opportunity. In connection with the carrying out of this project, the contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, ancestry, disability, age or marital status. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, national origin, ancestry, disability, age or marital status. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other compensation; and selection for training, including apprenticeship.

4. E-Verify. In accordance with Neb. Rev. Stat. 4-108 through 4-114, the contractor agrees to register with and use a federal immigration verification system, to determine the work eligibility status of new employees performing services within the state of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324 a, otherwise known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of a newly hired employee pursuant to the Immigration Reform and Control Act of 1986. The Contractor shall not discriminate against any employee or applicant for employment to be employed in the performance of this section pursuant to the requirements of state law and 8 U.S.C.A 1324b. The contractor shall require any subcontractor to comply with the provisions of this section.
5. Termination. This Contract may be terminated by the following:
 - 5.1) Termination for Convenience. Either party may terminate this Contract upon thirty (30) days written notice to the other party for any reason without penalty.
 - 5.2) Termination for Cause. The City may terminate the Contract for cause if the Contractor:
 - 5.2.1) Refuses or fails to supply the proper labor, materials and equipment necessary to provide services and/or commodities.
 - 5.2.2) Disregards Federal, State or local laws, ordinances, regulations, resolutions or orders.
 - 5.2.3) Otherwise commits a substantial breach or default of any provision of the Contract Document. In the event of a substantial breach or default the City will provide the Contractor written notice of said breach or default and allow the Contractor ten (10) days from the date of the written notice to cure such breach or default. If said breach or default is not cured within ten (10) days from the date of notice, then the contract shall terminate.
6. Independent Contractor. It is the express intent of the parties that this contract shall not create an employer-employee relationship. Employees of the Contractor shall not be deemed to be employees of the City and employees of the City shall not be deemed to be employees of the Contractor. The Contractor and the City shall be responsible to their respective employees for all salary and benefits. Neither the Contractor's employees nor the City's employees shall be entitled to any salary, wages, or benefits from the other party, including but not limited to overtime, vacation, retirement benefits, workers' compensation, sick leave or injury leave. Contractor shall also be responsible for maintaining workers' compensation insurance, unemployment insurance for its employees, and for payment of all federal, state, local and any other payroll taxes with respect to its employees' compensation.
7. Contract Term. This Contract shall be effective upon execution by both parties. The term of the Contract shall be a one (1) year term with the option to renew for three (3) additional one (1) year terms.
8. The Contract Documents comprise the Contract, and consist of the following:
 1. Instructions to Bidders
 2. Accepted Proposal/Response
 3. Contract Agreement
 4. Specifications
 5. Special Provisions
 6. Sales Tax Exemption Form 13

These Contract Agreements, together with the other Contract Documents herein above mentioned, form this Contract, and they are as fully a part of the Contract as if hereto attached or herein repeated.

The Contractor and the City hereby agree that all the terms and conditions of this Contract shall be binding upon themselves, and their heirs, administrators, executors, legal and personal representatives, successors, and assigns.

IN WITNESS WHEREOF, the Contractor and the City do hereby execute this contract.

EXECUTION BY THE CITY OF LINCOLN, NEBRASKA

ATTEST:

City Clerk

John E. Ross



CITY OF LINCOLN, NEBRASKA

Mayor

[Signature]

Approved by Executive No. _____

84008

dated _____

4/27/11

EXECUTION BY CONTRACTOR

IF A CORPORATION:

ATTEST:

See corporate resolution (SEAL)
Secretary

Enn's Paint Inc

Name of Corporation

P.O. Box 404 Enn's TX 75120
(Address)

By: *Dane Albrook*
Duly Authorized Official

Asst. Vice President
Legal Title of Official

IF OTHER TYPE OF ORGANIZATION:

Name of Organization

Type of Organization

(Address)

By: _____
Member

By: _____
Member

IF AN INDIVIDUAL:

Name

Address

Signature

City of Lincoln/Lancaster County (Lincoln Purchasing) Supplier Response

Bid Information		Contact Information		Ship to Information	
Bid Creator	Sharon R. Mulder Assistant Purchasing Agent	Address	Purchasing 440 S. 8th St. Lincoln, NE 68508	Address	Public Works & Utilities, Street and Traffic Operations
Email	smulder@lincoln.ne.gov	Contact	Sharon R. Mulder Assistant Purchasing Agent	Contact	901 N. 6th Street Lincoln, NE 68508
Phone	(402) 441-7410				
Fax	(402) 441-6513				
Bid Number	11-057				
Title	Annual Requirements for Thermoplastic Molten Pavement Marking Material	Department	Purchasing	Department	
		Building	Suite 200	Building	
Bid Type	Bid	Floor/Room		Floor/Room	
Issue Date	03/11/2011	Telephone	(402) 441-7428	Telephone	
Close Date	3/25/2011 12:00:00 PM CST	Fax	(402) 441-6513	Fax	
Need by Date		Email	smulder@lincoln.ne.gov	Email	

Supplier Information

Company Ennis Traffic Safety Solutions
 Address PO Box 404
 Ennis, TX 75120
 Contact Stacy Salik
 Department
 Building
 Floor/Room
 Telephone 800 (331) 8118 7235
 Fax 800 (555) 0217
 Email stacy.salik@ennistraffic.com
 Submitted 3/25/2011 9:07:31 AM CST
 Total \$29,700.00

Signature _____

Supplier Notes

Bid Notes

Bid Messages

Please review the following and respond where necessary

#	Name	Note	Response
1	Instructions to Bidders	I acknowledge reading and understanding the Instructions to Bidders.	Yes

2	Contact	Name of person submitting this bid:	Zac Cope
3	Specifications	I acknowledge reading and understanding the specifications.	Yes
4	Sample Contract	I acknowledge reading and understanding the sample contract.	Yes
5	Renewal is an Option	Contract Extension Renewal is an option.	Yes
6	Term Contract Provisions	I acknowledge reading and understanding the Term Contract Provisions.	Yes
7	Escallation/De-escalation	(a) Are your bid prices firm for a one (1) year contract period. YES or NO (b) Are your bid prices subject to escalation/de-escalation YES or NO (c) If (b), state period for which prices will remain firm: through _____	Yes, Yes 12-31-11
8	Delivery	State number of delivery days ARO. FOB to the City/County at the location specified with all transportation charges paid.	30-45 days ARO
9	Electronic Signature	Please check here for your electronic signature.	Yes

CITY OF LINCOLN
ENGINEERING SERVICES
SPECIFICATIONS FOR
THERMOPLASTIC MOLTEN PAVEMENT MARKING MATERIAL
BID NO. 11-057

1. SCOPE

- 1.1 These specifications cover a white reflectorized thermoplastic pavement marking material of a type that is suitable for application to Portland cement, concrete pavement or aged asphaltic concrete pavement without sealer or primer in a molten state by mechanical means with surface application of glass beads which, upon cooling to normal pavement temperature, produces an adherent reflectorized marking of specified thickness and width and capable of resisting deformation by traffic.
- 1.2 Bidder shall submit bid documents and all supporting material via e-bid.
- 1.3 All inquiries regarding these specifications shall be directed via e-mail or faxed written request to Sharon Mulder, Asst. Purchasing Agent (smulder@lincoln.ne.gov) or fax: (402) 441-6513.
 - 1.3.1 These inquiries and/or responses shall be distributed to prospective bidders electronically as an addenda
 - 1.3.2 The Purchasing Office shall only reply to written inquiries received within five (5) business days of bid opening.

2. CHARACTERISTICS OF MATERIAL

2.1 General:

- 2.1.1 The compound shall not deteriorate upon contact with sodium chloride, calcium chloride or other chemical used to prevent formation of ice on roadways or streets, or because of the content of pavement materials, and shall be impervious to oil and grease drippings from traffic.
- 2.1.2 In the molten state, the material shall not give off fumes which are toxic or otherwise injurious to persons or property.
- 2.1.3 The material shall not break down, deteriorate, scorch, or discolor is held at the molten temperature for a period of four hours, or by reason of four reheatings to the molten temperature.
- 2.1.4 The temperature versus viscosity characteristics of the plastic material shall remain constant through up to four reheatings, and shall be the same from batch to batch.
- 2.1.5 There shall be no obvious change in color of the material as the result of up to four reheatings, or from batch to batch.
- 2.1.6 The material shall be free from all skins, dirt, foreign objects, or such ingredients as will cause bleeding, staining, or discoloration.

2.2 Material Formula: The vendor shall have the option of manufacturing the thermoplastic pavement marking materials according to his own formulas.

- 2.2.1 Irrespective of which formula is used in the manufacture, the material shall contain not less than 30% of weight of glass beads, not less than 22% nor more than 26% by weight of resin binder, and not less than 10% by weight of titanium dioxide.
- 2.2.2 The binder shall contain not less than 8% by weight of maleic-modified glycerol ester resin.
- 2.2.3 The filler shall be white calcium carbonate or equivalent filler with a compressive strength of five thousand (5,000) pounds per square inch.

- 2.2.4 The pigment, beads, and filler shall be evenly dispersed in the resin binder.
- 2.3 Suitability for Application: The thermoplastic material shall be a product especially compounded for traffic markings.
 - 2.3.1 The markings shall not show appreciable deformation or discoloration under normal traffic conditions at temperatures below 140° F.
 - 2.3.2 Markings shall have a uniform cross-section.
 - 2.3.3 The density and character of the material shall be uniform throughout its thickness.
 - 2.3.4 The stripe shall maintain its original dimensions and placement.
 - 2.3.5 The exposed surface shall be free from tack and shall not be slippery when wet.
 - 2.3.6 The material shall not lift from the pavement in freezing weather.
 - 2.3.7 Cold ductility of the material shall be such as to permit normal movement with the road surface without chipping or cracking.
 - 2.3.8 When applied at the maximum bond temperature certified by the material manufacturer and thickness of 1/8 inch to 3/16 inch, the material shall set to bear traffic 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.
 - 2.3.9 The thermoplastic material shall readily extrude at temperatures below 450° F. from the equipment used to produce a cross-section of line 1/8-inch to 3/16-inch thick which shall be continuous, uniform in shape and have clear and sharp dimensions.
- 2.4 Reflectorization: During manufacture, reflectorizing glass beads shall be mixed into the material to the extent of not less than 30% nor more than 40% by weight of the material.
 - 2.4.1 Required properties of glass beads used shall be as per Section 4 of this specification.

3. PHYSICAL REQUIREMENTS OF MATERIAL

- 3.1 Color: White.
 - 3.1.1 As demonstrated by a standard color difference meter, the material shall show deviations from a magnesium oxide standard not greater than the following after the material has been heated for four hours at 425° F.:

Reflectance (Rd)	75 Minimum
Redness-Greenness (a)	0 ...+ or -5%
Yellowness-Blueness (b)	0 ...+ or -10%
 - 3.1.2 White thermoplastic material shall contain a minimum of 10% titanium dioxide by weight and, after setting, shall be pure white and free from dirt or tint.
- 3.2 Color Retention: Retention of the initial color shall be determined by the following procedure:
 - 3.2.1 Specimens shall be prepared and tested from samples submitted in accordance with ASTM D-795.
 - 3.2.2 The ultra-violet light source shall be as specified in the test procedure, or may be a General Electric 275-watt sun lamp, type RS, with a built-in reflector.
 - 3.2.3 After 100 hours of exposure, the test specimens should show no perceptible color change (as indicated by comparison with an unexposed specimen).
- 3.3 Water Absorption: material shall have no more than 0.5%, by weight, of retained water when tested by ASTM D-570, "Water Absorption of Plastic", procedure (A).
- 3.4 Softening Point: Material shall have a softening point of not less than 200° F. after the material has been heated for four hours at 425° F., as determined by ASTM E-28.

- 3.5 Specific Gravity: Specific gravity of the thermoplastic compound at 77° F shall be from 1.6 to 2.15.
- 3.6 Impact Resistance:
- 3.6.1 Impact resistance shall not be less than 11 inches-pounds at 77° F. after the material has been heated for four hours at 425° F. and cast into bars of one inch cross-sectional area, three inches long and placed with one inch extending above the vice in a cantilever beam (IZOD Type) tester using the 25 inch-pound scale.
- 3.6.2 This device is described in ASTM D-256.
- 3.6.3 When tested by the Gardner Falling Weight method, impact resistance shall be not less than 80 inch-pounds (9.0 N•m) with no visible surface cracks after the material has been heated for four (4) hours at 425° F (218° C) and applied to a portland cement concrete block, allowed to cool and tested in accordance with ASTM D 5420, Section II.
- 3.7 Flowability:
- 3.7.1 After heating for four hours at 425° F., the material shall have a maximum flow residue of 18 percent.
- 3.7.2 After heating for two hours and subsequently stirring for six hours at 200 rpm at 425° F., the material shall have a maximum flow residue of 28 percent.
- 3.8 Bond Strength: When two concrete blocks, 2 inches x 3 ½ inches x 7 inches are bonded together on the 3 ½ inch x 7 inch faces with a 1/16 to 1/8 inch layer of the thermoplastic pavement marking material and tested in accordance with ASTM D-4796, the bond strength shall be not less than 275 pound per square inch.
- 3.8.1 The material must also retain a 180 pound per square inch minimum bond strength when tested by the Freeze-Thaw described in Section 5.3 of this specification.
- 3.9 Indentation Resistance: The reading of the Shore Durometer, type A2 as described in ASTM D-2240, after fifteen seconds and using a two-pound weight, shall not be less than the amounts specified below when the material is tested after heating for four hours at 425° F. and cooled to the following temperatures:
- | Temperature | Reading |
|-------------|----------------|
| 115° F. | 65 ...+ or -2% |
| 77° F. | 95 ...+ or -2% |
- 3.10 Abrasion Resistance: The material shall show a maximum loss of 0.5 grams when subjected to 200 revolutions on a Taber abraser at 25° C., using H-22 calibre wheels weighted to 500 grams.
- 3.10.1 The wearing surface should be kept wet with distilled water throughout the test.
- 3.10.2 The panel for this test shall be prepared by forming a representative lot of material at a thickness of 0.125 inch on a 4 inch square model panel (thickness 0.050 inch +0.001 inch) on which a suitable primer has been previously applied.
- 3.11 Low Temperature Stress Resistance: The material shall show no cracking when tested according to ASSHTO T250, Section 7 with Section 7.2.3 modified for an extended cold temperature [15° +/- 3°F (9.4° +/- 2° C)] exposure period of 72 hours.

4. PROPERTIES OF GLASS BEADS FOR REFLECTORIZATION

- 4.1 Crushing Resistance: The average crushing resistance of glass beads shall be 40-pound dead weight for 20 to 30 mesh beads.
- 4.2 Roundness: A minimum of 80% of the beads of each sieve size shall be water white true spheres as determined by ASTM D-1155, and shall be free from imperfections of

all types including film, scratches, pits, clusters, opaqueness, and non-spherical shape.

4.3 Index of Refraction: The glass beads shall have a refractive index of not less than 1.50 when tested by the liquid immersion method at 25° C.

4.4 Gradation: Glass beads intermixed in the thermoplastic materials shall have the following gradations when tested in accordance with ASTM D-1214:

<u>Sieve Number</u>	<u>Percent Passing</u>
20	95-100
30	80-95
50	40-70
100	0-10

4.5 Chemical Resistance: The glass beads shall withstand immersion in water and acids without undergoing noticeable corrosion or etching and shall not be darkened or otherwise noticeably decomposed by sulfides.

4.5.1 The tests for chemical resistance shall consist of one hour immersion in water and in solutions of corrosive agents followed by microscopic inspection.

4.5.2 A three to five gram portion of the sample shall be placed in each of three Pyrex-glass beakers or porcelain dishes; once sample shall be covered with distilled water, one with a 3N solution of sulfuric acid and the other with a 50% solution of sodium sulfide.

4.5.3 After one hour of immersion, the glass beads of each sample shall be examined microscopically for evidence of darkening and frosting.

5. TESTING

5.1 Pavement Marking Material: The manufacturer shall furnish the City of Lincoln Street and Traffic Operations Division with three copies of a notarized, certified, test report from an independent laboratory showing the results of tests conducted on the formula and physical requirements of the thermoplastic material in each manufacturing lot or batch to be shipped to the project.

5.1.1 The minimum size batch of thermoplastic pavement marking material sampled and tested shall not be less than 3,000 pounds.

5.1.2 The material shall be tested in accordance with the appropriate method in AASHTO T-250 or as noted.

5.2 Glass Beads: The manufacturer shall furnish the City of Lincoln Street and Traffic Division with three copies of a notarized, certified test report from an independent laboratory showing the results of tests conducted on the glass beads to be intermixed in the material.

5.3 Freeze-Thaw Test (Texas Transport Institute Method)

5.3.1 Objective: The test is designed to determine the extent to which thermoplastic materials retain their original properties and bond strength after repeated freeze-thaw cycles.

5.3.1.1 The material-primer system must be capable of retaining an average bond strength for 3 tests in excess of 180 psi.

5.3.1.2 The proper primer shall be supplied by the manufacturer of the thermoplastic material.

5.3.2 Apparatus:

5.3.2.1 Concrete blocks.

5.3.2.2 Bond strength testing apparatus.

- 5.3.2.3 Primer supplied by the thermoplastic manufacturer.
- 5.3.2.4 2-inch (5.1 cm) diameter metal cylinders (three for each material tested).
- 5.3.2.5 Large containers of water.
- 5.3.2.6 Adhesive (epoxy).
- 5.3.3 Procedure:
 - 5.3.3.1 The thermoplastic shall be heated to 425° F., and applied over the primer on the concrete block in 2-inch (5.1 cm) diameter bond strength specimens (3 per block).
 - 5.3.3.2 After a minimum 24-hour curing time, cement a 2-inch metal cylinder to each thermoplastic specimen with epoxy adhesive.
 - 5.3.3.2.1 Take care to remove any excess epoxy and do not allow the epoxy to flow out and over the thermoplastic.
 - 5.3.3.3 After allowing the epoxy to cure for 24 hours, the samples shall be subjected to 5 cycles of freeze-thaw.
 - 5.3.3.3.1 Do this by allowing water to freeze up the tops of the concrete blocks, without water contact with the thermoplastic, in a -10° F. environment.
 - 5.3.3.3.2 The samples are then placed in a 100° F. environment to thaw.
 - 5.3.3.3.3 The freeze cycle shall be for 8 hours and the thaw cycle for 16 hours, completing a 24-hour day.
 - 5.3.3.4 After the five cycles of Section 5.3.3.3, pull the patties apart at room temperature and record the bond strength.

6. APPROVED MATERIAL

- 6.1 The City reserves the right to conduct whatever tests are deemed necessary to identify and determine the quality, characteristics and uniformity of any material.
- 6.2 Thermoplastic (molten) pavement marking materials intended for application to portland cement concrete pavement, or aged asphaltic concrete pavement without sealer or primer, and which have not been tested and given prior approval by the Engineer, will not be permitted.

7. PACKAGING, SHIPPING AND LABELING

- 7.1 The thermoplastic material shall be shipped in granular form in 50-pound bags that are waterproof and to which the material will not adhere during shipment or storage.
- 7.2 The bags shall be strong enough to permit normal handling during shipment and transportation after exposure to high humidity.
- 7.3 Each bag shall be labeled to designate the color, manufacturer's name, batch number, and date of manufacture.
- 7.4 Each batch manufactured shall have its own separate number.
- 7.5 The manufacturer shall state on the bag an application temperature which his experience indicates a maximum bond strength will be achieved.
- 7.6 The label shall warn the user of the maximum temperature that the material may be heated during application.
- 7.7 All shipments shall be made in a flat bed trailer. No enclosed trailers shall be allowed.