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## Specifications for Tennessee Highway Patrol (THP) Police Pursuit Vehicles Removable Vehicle Markings

### Purpose:

The Tennessee Highway Patrol (THP), a Division within the Tennessee Department of Safety and Homeland Security (TDOSHS), is seeking to establish a new five (5) year contract to provide services for the printing and manufacturing of police pursuit vehicles' reflective removable vehicle markings.

These specifications cover the requirements for materials and processing of reflective, positionable, conformable, and removable pressure activated automotive markings to include shields and legends.

### Contractor Requirements

The Contractor shall certify that all items furnished shall conform to the specifications and shall replace, or repair, all items that fail to meet the requirements of these specifications at no additional costs to the State.

### Specifications

#### A. Performance Characteristics

##### I. Photometric

- a. **Background** – The Retro-reflective sheeting used to produce the markings shall have the following minimum brightness values at 0.2 degrees observation angle—expressed as candlepower per square foot (candelas/lux/square meter)—of retroreflective material. Measurements shall be conducted in accordance with testing procedures for reflective sheeting (Paragraph 4.4.7 of Federal Specifications L-S-300C, “Sheeting and Tape, Reflective: Non-exposed lens, Adhesive Backing”

ENTRANCE ANGLE	WHITE
-4 Degree	70.0
30 Degree	30.0

- b. **Rainfall Performance** – the brightness of the unprinted retroreflective sheeting used to make the Tennessee emblems when totally wet by rain shall not be less than ninety percent (90%) of the above values. Wet performance measures shall be conducted in accordance with Retroreflective Photometric Performance (RPP) rainfall test method specified in federal specifications L-S-300C, Paragraph 4.4.9.4, “Sheeting and Tape, Reflective: Non-exposed Lens, Adhesive Backing”
- c. The retroreflective marking, plus adhesive, shall have a .005” minimum and .010” maximum thickness.
- d. **Backing paper** – the adhesive shall be protected by a suitable protective liner that is easily removed without the use of water or other solvents. Protective liner shall not contain any material which might stick to the adhesive and reduce adhesion of film.

- e. **Adhesive** – film shall have a positionable, removable pressure activated adhesive capable of being applied at temperature of fifty-five degrees Fahrenheit (55°F) to one-hundred degrees Fahrenheit (100°F) without pre-adhesion wrinkles or bubbles and be removable for up to four (4) years—leaving little or no adhesive residue from vertical automotive painted surfaces. Film shall be warranted against paint damage when removed within four (4) years.
- f. There shall be no effect on the adhesive tack or performance following exposure of the adhesive face under a new general electric rs (this is the type of sunlamp used for testing) sunlamp for a period of six (6) hours at a distance of eight inches (8”).
- g. **Exterior Exposure** – the retroflective marking shall withstand four (4) years—three (3) for black—no appreciable deterioration such as cracking, blistering, delamination, or loss of adhesion. A slight amount of color fading and chalking is permissible.
- h. **Conformability** – The emblem shall be sufficiently flexible to permit application, without cracking, to moderately contoured surfaces, such as corrugations and rivets within the temperature range specified by the sheeting supplier.
- i. **Test Panel Preparation:** Test panels shall be prepared using a premasked twelve and one-half inches (12.5”) x twelve and one-half inches (12.5”) piece of the reflective marking applied with firm squeegee pressure to a clean twelve inches (12”) x twelve inches (12”) aluminum panel—trimmed evenly at the edge of the panel and aged for forty-eight (48) hours at eighty degrees Fahrenheit (80°F) ± ten degrees Fahrenheit (10°F). after preparation, the final requirements shall be met:
  - i. Initial adhesion shall pass requirements for Class I and III as defined in paragraph 3.4.4 in federal specifications LS -300C, “Sheeting and Tape, Reflective: Non-exposed lens, Adhesive Backing”; and
  - ii. The reflective marking shall show not more than 1/64” shrinkage in any dimension of the edge of the twelve inches (12”) x twelve inches (12”) aluminum panel after being subjected to a temperature of one hundred fifty degrees Fahrenheit (150°F) for forty-eight (48) hours.
- j. **Fuel Resistance:** Marking applied as in Section A.I.i. shall exhibit no color change, loss of bond, or material degradation after immersion ten (10) times for ten seconds (:10) into a freshly prepared solution of reference fuel (85% isooctane, 15% xylol) with a twenty-second (:20) evaporation period between each dip.
- k. When subjected to a temperature of one hundred fifty degrees Fahrenheit (150°F) for twenty-four (24) hours, the reflective marking shall show no delamination or loss of adhesion.

## II. Fabrication

- a. **Materials** – the base sheeting shall be 3M “Scotchlite” removable reflective sheeting series 680CR—meeting the requirements of all sections of these specifications—and shall be screen processed used “Scotchlite” transparent screen printing ink series 4400 and SCOTCHLITE transparent screen printing ink series 4440 clear coating.

- b. **Color** – the emblems, striping, legends, and numbers shall be matched to the following:
- i. Gold Color – 3M Series 680CR – 64 sheeting
  - ii. Black color – 3M Series 680CR – 85 sheeting
- c. **Emblems:** shall be as follows:
- i. Side Door Emblems
    - Two (2) per vehicle
    - Shape: shape of the state of Tennessee
    - Size: eight inches (8”)wide x thirty-six inches (36”) length
    - Configuration: Charter Oak font, verbiage “Tennessee”
    - Color: Black with Gold Outline
  - ii. Identification Legend
    - Two (2) per vehicle
    - Size: three inches (3”) wide x thirty-four inches (34”) long
    - Configuration: Charter Oak font, verbiage “State Trooper”
    - Color: Black
  - iii. Deck Lid Legend
    - One (1) per vehicle
    - Configuration: Charter Oak font Verbiage “State Trooper”
    - Size: two inches (2”) x twenty-four inches (24”)
    - Color: Gold reflective
  - iv. Striping (fifteen (15) yards per vehicle)
    - Two inches (2”) black
    - One-quarter inch (1/4) void
    - Two inches (2”) gold
    - One-quarter inch (1/4) void
    - Two inches (2”) black
- d. **Construction:** Supplied on common release linear and premixed on six and one-half inches (6.5”) x fifty (50) yards rolls
- e. The State shall make purchases as a set. Each set shall consist of the following:
- a. Two (2) side door emblems
  - b. Two (2) identification legends
  - c. One (1) deck lid legend
  - d. Fifteen (15) yards of striping
- f. Vehicle makes and models may change during the term of the Contract. The State shall provide the Contractor with a ten (10) business day notice of any changes to vehicle makes and models.
- III. Additional Specifications
- a. The Contractor shall supply the State with an initial design and/or prototype within ten (10) business day of the Effective Date of the Agency Term Contract; and



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- b. The design and/or prototype shall be approved by the State's Captain of the Fleet Unit—a unit within the THP Division—prior to the complete production of the vehicle markings.