SP-150066
(New)

SPECIAL PROVISIONS
FOR
PAVER MOUNTED INFRARED TEMPERATURE EQUIPMENT
FOR THERMAL PROFILES

Linn County
NHSX-100-1(51)--3H-57

Effective Date
January 20, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATION.

150066.01 DESCRIPTION.
Utilize Paver Mounted Infrared Temperature Equipment to continually monitor the temperature of the mat immediately behind the paver(s) during placement operations of all driving lanes within the limits of the work as described in the Plans. Provide thermal profiles that include material temperature and measurement locations for quality control to the Engineer.

150066.02 EQUIPMENT.
Utilize a thermal equipment supplier that can provide a qualified representative for on-site technical assistance during the initial setup, pre-construction verification, and data management and processing as needed during the Project to maintain equipment within specifications and requirements.

Provide operator settings, user manuals, required viewing/export software for analysis. Ensure the temperature equipment will meet the following:

A. A device with one or more infrared sensors that is capable of measuring in at least 1 foot intervals across the paving width, with a minimum width of 12 feet, or extending to the recording limits of the equipment, whichever is greater. No brackets are allowed in the influence area under the sensors. A temperature profile must be made on at least 1 foot intervals longitudinally down the road:

B. Infrared sensor(s).

1. Measuring from 32°F to 400°F and with

2. An accuracy of ± 2.5°F or ± 1.5% of the sensor reading, whichever is greater.

C. Ability to measure the following.

1. The placement distance using a Distance Measuring Instrument (DMI) and a Global Positioning System (GPS).

2. Stationing.

D. Real Time Kinematic (RTK) based Global Positions System (GPS) with base station corrections shall be used for determining the position of the paver and temperature sensors, with a differential correction tolerance less than 0.1 feet in the X and Y direction.

E. Latest version of software to collect, display, store and analyze the mat temperature readings during placement. The software must have the ability to create and analyze:

1. Full collected width of the thermal profiles,

2. Paver speed and

3. Paver stops and duration for the entire Project.

F. Ability to export data automatically to a remote data server ("the cloud"). At the preconstruction meeting, provide the Department with passwords/rights to allow for web access to the data file location.

This web-based software must also provide the Department with the ability to download the raw files and software and to convert them into an ASCII format.

G. The thermal profile data files submitted must be in comma or semicolon delimited ASCII formatting and conform to the following tables.

Table 1500XX.02-1: Essential Data Included in Header

Item No.	Description	Example Data
1	Section Title	Highway 77
2	Machine Manufacture	ABC Company
3	Machine Model	Temp Bar
4	Number of temperature sensors, N	10
5	Spacing between temperature sensors (inch)	13
6	Temperature sensor height above HMA mat (inch)	36
7	Reporting resolution for independent temperature sensor data – in the paver moving direction (inch)	13
8	Number of temperature sensor data blocks	5000

Table 1500XX.02-2: Essential Data for Block Elements

Item No.	Data Field Name	Example Data
1	Date Stamp (YYYYMMDD)	20080701
2	Time Stamp (HHMMSS.S - military format)	090504.0 (9 hr. 5 min. 4.0 s.)
3	Longitude (decimal degrees, with at least 6 significant digits)	94.859204
4	Latitude (decimal degrees, with at least 6 significant digits)	45.227773
5	Distance (feet)	1
6	Direction heading (degree angle, clockwise from the north)	45
7	Speed (fpm)	30.0
8	Surface temperature Sensor 1/Location 1 (°F)	290
9	Surface temperature Sensor 2/Location 2 (°F)	295

…	…	…
N	Surface temperature Sensor N/Location N (°F)	300

Temperature sensors/locations are numbered from 1 to N, left to right, in the direction of paving.

150066.03 CONSTRUCTION.

A. Pre-Construction Requirements.

1. Temperature Sensor(s).
Verify that the temperature sensor(s) are within the limits specified in 150066.02, B, 2, using an independent temperature device on a material of known temperature.

2. GPS.
Collect and compare the GPS coordinates from the equipment with an independent measuring device. Ensure the independent survey grade GPS measurement device is calibrated to the correct coordinate system (using a control point), prior to using these coordinates to validate the equipment GPS.

3. DMI.
Verify the DMI has the correct correction factor for accurate stationing.

B. Construction Requirements.

1. Install and operate equipment in accordance with the manufacturer's specifications.

2. Verify the temperature sensor(s) and GPS is working within the requirements of this Special Provision when requested by the Engineer.

3. Collect thermal profiles on all driving lanes for each lift during the asphalt paving placement operation.

C. Equipment Breakdowns.

1. Contact the Engineer immediately when System Failure occurs. System Failure is defined as when more than 20% of the day's paving distance that the paver(s) with the mounted infrared temperature equipment traveled does not meet the requirements of 150066.02 from one or more sensors. System shall be repaired and fully operational within 2 working days of System Failure.

2. In the event of equipment breakdown, thermal profiling system malfunctions and/or GPS problems, the Contractor may temporarily operate with conventional paving operations; but thermal profiling data shall be collected and provided for a minimum of 80% of the project's mainline driving lanes.

D. Data Submittal.
Transfer the data to the remote data server or if automatic data transmission is not available, transfer the data to the Engineer immediately following completion of the project. The Engineer may request data at any time during paving operations. The Engineer may require re-submittal when the data does not conform to the proper format.

150066.04 METHOD OF MEASUREMENT.
Paver Mounted Infrared Temperature Equipment for Thermal Profiles will not be measured, as it will be paid as a lump sum.

150066.05 BASIS OF PAYMENT.

A. Payment for Paver Mounted Infrared Temperature Equipment for Thermal Profiles will be the contract lump sum price.

B. Payment is full compensation for all costs related to providing the GPS system, equipped paver(s), transmission/transfer of electronic data files, one copy of vendor software, and any other equipment required for the thermal profiling process. All quality control procedures including thermal profiling and GPS systems representative's technical support and on-site training shall be included in the contract lump sum price.

C. Delays due to GPS satellite reception of signals to operate the thermal profiling equipment will not be considered justification for any adjustment to the contract lump sum price or to contract time.