

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

INTELLIGENT COMPACTION FOR HOT MIX ASPHALT (HMA)

PROJECT 1-094(179)156 – PCN 20820

DESCRIPTION

This work consists of compacting asphalt using Intelligent Compaction (IC) rollers. This Special Provision is in addition to the requirements of Section 430, “Hot Mix Asphalt (HMA)”.

EQUIPMENT

A. Rollers.

Provide breakdown and intermediate rollers that meet the requirements of Section 151, “Rollers” equipped with following:

- Noncontact temperature sensor mounted to measure pavement surface;
- Global Positioning Systems (GPS) equipment including:
 - Receiver;
 - Antenna; and
 - Telemetry equipment;
- A color monitor that is capable of the following:
 - Displaying real time color coded map with the number of passes;
 - Roller speed;
 - Surface temperature;
 - Vibration frequency;
 - Vibration amplitude;
 - Data that is transferable by USB and cellular connection; and
 - Is easily visible to the operator without obstructing normal operations.

Provide instrumented roller accuracy shown in Table 1.

Table 1	
Operating Parameter	Accuracy
Speed	± 0.5 mph
Frequency	± 2 Hz
Amplitude	± 0.008 in
Temperature	± 2.7 °F

B. GPS.

1. General.

GPS and Global Navigation Satellite System (GLONASS) may be used simultaneously and will provide a minimum of 90% coverage of the project site.

2. Roller GPS.

Provide GPS on the roller with an accuracy of ±0.2 ft in the X and Y direction.

3. Rover GPS.

Provide a rover with Real Time Kinematic (RTK) GPS with accuracy of ± 0.1 ft.

CONSTRUCTION REQUIREMENTS

A. IC Work Plan:

In addition to the HMA quality control plan, submit an IC Work Plan at least 2 weeks before the preconstruction conference.

Include the following information in the IC Work Plan:

- Roller Type and make;
- Roller dimensions and weight;
- IC system type including:
 - Vendor;
 - Model Number; and
 - Data output;
- Data collection method including:
 - Sampling rates;
 - Intervals; and
 - Data file types
- Temperature measurement system manufacturer;
- Number of IC rollers; and
- List of personnel trained to work on IC system including the data analysis.

B. Training.

Provide an IC system's representative for approximately 4 to 8 hours of on-site training at a location that is suitable for the needs of the training.

Include the Contractor's and the Engineer's personnel in the training. During the training cover the following:

- Background information for the IC system;
- Setup and checks for the following:
 - IC system;
 - GPS receiver;
 - Base-station; and
 - Rovers;
- Operation of the IC system on the roller
- Transferring raw IC data;
- Operation of the Vendor's software to open and view raw IC data files and exporting all data files in Veta-compatible format;
- Operation of Veta software including:
 - Importation of files;
 - Creation of maps ; and
 - Interpretation of data.

C. GPS Calibration.

The Engineer will supply 3 control points for the project corridor a minimum of two weeks before the start of construction. The control points are under the North Dakota South Zone State Plane coordinates with the horizontal datum based on NAD83(2011) and vertical datum based on NAVD 88 using GEOID 12A.

Complete a site calibration and site setup of the IC according to the manufacturer's instruction before beginning paving operations.

Perform one GPS calibration check on the IC rollers and the rover daily at the beginning of each work day.

D. Roller Operations.

Provide an IC manufacturer's representative for the first 2 days of paving.

Operate the IC roller according to the IC manufacturer's recommendations.

E. Equipment Malfunction.

Immediately contact the Engineer when a malfunction of any IC roller or a breakdown of an IC equipped roller occurs. Provide written documentation of the failure including the following:

- Date and time;
- Location;
- Brief description of failure;
- IC or roller equipment that failed;
- Method of repair; and
- Date and time the equipment was brought back into service.

A conventional roller may replace an IC roller, but IC mapping data will continue. A minimum of 80% of the plan quantity of HMA will be mapped using IC.

F. Data Submittal.

Upload all measurement data to the cloud storage at 15 minute intervals or once per day when no cellular coverage is available.

Transfer all IC data to the Engineer at the end of each working day. The Engineer may request data any time during compaction operations.

G. Data Analysis Software.

Export all measurements into Veta which is available from the website:

<http://www.intelligentcompaction.com>.

Provide the Engineer with user identification to access both the cloud storage and cloud computing.

Use Veta to create project files with the temperature, roller coverage, and reports of the HMA.

F. GPS Rover.

Use the GPS Rover to record the location of the HMA cores taken and to check the calibration of the IC rollers GPS.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Pay Item	Pay Unit
Intelligent Compaction	Lump Sum

Payment for IC will be based on the percentage of the plan quantity HMA place on each progressive estimate.

Delays due to GPS satellite reception issues or IC roller breakdowns will not be considered justification for contract modifications or contract extensions.

Such payment is full compensation for furnishing all equipment, labor, and incidentals to complete the work as specified.