FAA ALASKA REGION

MODIFICATION OF AIRPORT STANDARDS

BACKGROUND ANC_2021_22954 (APPROVED)

Airport	Location (City, State)	LOC ID
ANC	ANCHORAGE, AK	PANC

Runway

Affected Taxiway/TDG

Design Aircraft (Each Runway/Taxiway)

N/A, Applies to all ADOT airports Statewide

AIP Grant Number

Passenger Charge Code (PFC)

MODIFICATION OF STANDARDS

AC Number	Chapter	Paragraph	Page Num
150/5370-10H	Flexible Pavements (New)	No FAA Standard (New)	

Title of Standard Being Modified (Cite Reference Document)	AC Published Date
Standard Specifications for Construction of Airports	2018-12-21

EB Number

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Title of Airport Engineering Brief	EB Published Date

Category	Materials
Sub Category	Flexible Surface Course, P-400's

1. Standard/Requirement

None, No FAA standard

2. Proposed

See attachment

3. Explain Why Standard Cannot be Met (FAA ORDER 5300.1)

N/A, there is no FAA standard for intelligent compaction

4. Discuss Viable Alternatives (FAA ORDER 5300.1)

None

5. Explain Why the Modification is Necessary to Conform to Local Laws and Regulations (if Applicable)

Necessary for DOT&PF to administer the construction contract.

6. State Why Modification Would Provide Acceptable Level of Safety, Economy, Durability, and Workmanship (FAA ORDER 5300.1)

Proposed modification of Item P-411 has no impact on Safety. Economy, Durability, and Workmanship.

7. Explain any Special Operational Procedures and/or Restrictions Necessary to Accommodate the Modification of Standards

Not applicable, there are none

SPONSOR

Full Name	Position	Date
Jefferson Jeffers	Standard Specifications Engineer	02/16/2021

REGION

Date of Latest FAA Signed ALP
02/14/1917
Recommendation
Approval

Full Name	Position	Date
Kristi Warden	Acting Div Director	03/26/2021

HEADQUARTERS

Recommendation		
Full Name	**Position**	**Date**

POST APPROVAL

Effective Start Date	Post Implementation Complete Date
03/26/2021	

COORDINATION USERS

Date	Name	Coordination level	Concur

CONDITIONS

Date	Condition	ADO	RO

ITEM P-411 INTELLIGENT COMPACTION FOR ASPHALT MIX PAVEMENT

DESCRIPTION

411-1.1 This work shall consist of the compaction of asphalt mixtures using Intelligent Compaction (IC) equipment, and providing High Accuracy Positioning System (HAPS), technical assistance of the IC equipment manufacturer's on-site technical representative, associated training, testing, and documentation as described herein. This specification shall apply for each lift of asphalt mix pavement.

Do not begin paving work until the Engineer has approved all submittals, equipment, test results, training, and personnel required in this Section.

The Engineer may require the replacement of ineffective equipment, or unqualified or ineffective Quality Control personnel. The Engineer may require that work be stopped until Quality Control corrective actions are taken. Any costs associated with such a work stoppage are the Contractor's responsibility.

SUBMITTALS

411-2.1 IC QUALITY CONTROL PLAN. Prepare and submit a written IC Quality Control Plan (ICQCP) for the project. Submit an ICQCP 24 hours before the pre-paving conference scheduled according to P-401-3.6. As a minimum, the ICQCP shall contain the following information:

a. IC equipment list.

b. User manuals for all IC equipment and software to be used.

c. Detailed Procedure for correlating and verifying the HAPS for the IC roller(s) and rover(s).

d. Detailed Plan and Procedure for the construction of the Control Strip as described in Item P-401-3.5, to establish target compaction pass counts and target values for the strength of the materials using the standard testing devices, e.g. Nondestructive density gauges, pavement cores, and IC roller(s).

e. Procedures for monitoring of the construction operations and the IC roller(s) during production and final evaluation operations.

f. Procedures to monitor the ongoing IC data including pavement temperature, number of roller passes and the required level of compaction.

g. Process and procedure for analysis of the IC data from the roller(s). The frequency of reviewing the data from the roller shall be at a minimum of twice per shift of asphalt placement and compaction operations. The data shall be date/time stamped which permits for external evaluation at a later time.

h. Process and Procedure for Pre-construction training for the field personnel including the roller operator(s) and Department personnel regarding the proper operation of the IC technology, including but not limited to: setup of IC rollers, set up of a HAPS base station and/or universal total station (UTS), verification IC accuracy measurement with a hand-held rover, IC data analysis, and in-situ point test measurements.

i. Plans to achieve minimum compaction prior to mat temperatures cooling below compaction temperatures. IC roller compaction process needs to be completed (final IC roller pass) before the mat temperature falls below a minimum of 240° F (115° C) for the initial phase (breakdown) and 200° F (93° C) for the intermediate phase.

j. Written certification by the IC equipment manufacturer's on-site technical representative that all equipment to be used is in satisfactory mechanical condition and can function properly during production, placement and compaction operations.

k. Location accuracy verification testing to be conducted daily during production operations.

l. Ground-truth test of equipment and system prior to any paving work.

m. Procedure for replacement of ineffective equipment, or unqualified personnel, or other Quality Control corrections required by the Engineer.

CONSTRUCTION REQUIREMENTS

411-3.1 EQUIPMENT

a. IC Roller: IC rollers shall be self-propelled double-drum vibratory rollers.

b. Roller-Mounted Equipment. Rollers shall be equipped with:

(1) **Accelerometers** mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compaction effort.

(2) Non-contact **temperature sensors** for measuring pavement surface temperatures.

(3) **High Accuracy Positioning system**: Real Time Kinematic Global Positioning System (RTK-GPS) or Universal Total Station (UTS) components, capable of +-0.3 foot accuracy.

(4) Integrated on-board **documentation system** capable of displaying, recording, and exporting real-time color-coded maps of IC measurement values, storing data, and of transferring the data via wireless network, with a USB port for backup. The data shall include:

i. Stiffness response values

ii. Location of the roller

iii. Number of roller passes

iv. Pavement surface temperatures

v. Roller speeds

vi. Vibration frequencies of roller drums

vii. Amplitude of roller drums

c. Data Analysis Software. The software must provide "near real time" feedback of each roller's data output with a simple graphical user interface. Supply the Engineer access to the data in the same "near real time" as the operators. Essential IC Data Information and Essential IC Data Elements are listed in Tables 411-1 and 411-2, respectively.

The manufacturer's Intelligent Compaction software, or cloud computing, shall map and export gridded all-pass data and resemble AASHTO PP 81 section 4.3.5.2 as much as possible. At minimum, the exported data shall consist of the required fields in Table 5 of AASHTO PP 81 in order to allow adequate filtering in Veta. Veta, the standardized data analysis software, is available at: https://www.intelligentconstruction.com/veta/. Veta shall utilize the Intelligent Compaction Measurement Value (ICMV) data from the IC roller for analysis of coverage, uniformity, and stiffness values during construction operations.

Table 411-1. Essential IC Data Information

Item No.	Description
1	Section Title
2	Machine Manufacture
3	Machine Type
4	Machine Model
5	Drum Width (ft)
6	Drum Diameter (ft)
7	Machine Weight (lbs)

Table 411-2. Essential IC Data Elements

Item No.	Date Field Name	Example of Data
1	Date Stamp (YYYYMMDD)	e.g. 20080701
2	Time Stamp (HHMMSS.S)	e.g. 090504.0 (9 hr 5 min. 4.0 s.)
3	Longitude (decimal degrees)	e.g. 94.85920403
4	Latitude (decimal degrees)	e.g. 45.22777335
5	Northing (ft)	e.g. 1354048.30
6	Easting (ft)	e.g. 5009934.90
7	Elevation (ft)	e.g. 339.945
8	Roller pass number	e.g. 2
9	Direction index	e.g., 1 forward, 2 reverse
10	Roller speed (mph)	e.g. 2.0
11	Vibration on	e.g., 1 for yes, 2 for no
12	Frequency (vpm)	e.g. NA
13	Amplitude (mm)	e.g. NA
14	Surface temperature (°C) - HMA	e.g. 120

d. Data Analysis Hardware. Provide a 'laptop' computer, meeting specifications at the Intelligent Construction website: https://www.intelligentconstruction.com/veta/#1544637131315-c1aae5c4-1eee, for the use of the Engineer. The ownership of the computer will revert to the Contractor at the end of the project.

411-3.2 DOCUMENTATION. Provide the following documentation for each paving shift.

a. Quality Control Tests. All asphalt quality control test results shall be submitted to the Engineer within 24 hours of testing.

b. Equipment. Documentation of the manufacture, model, type of asphalt paver, and rollers used each day of asphalt operations. Include the positioning of the IC roller(s).

c. IC Roller Data. For each paving shift, provide a file containing information on all passes, as well as a 'proofing' file including data from the last pass only.

411-3.3 PERSONNEL AND TRAINING.

a. IC Quality Control Personnel. Submit the name, telephone number, duties, and employer of all quality control personnel necessary to implement the ICQCP. The minimum qualifications of quality control personnel shall be as follows:

(1) IC Field Manager or IC Plan Administrator. The person responsible for the execution of the ICQCP and liaison with the Engineer. Additionally the IC Field Manager requirements include:

(a) Full-time employee of the Contractor or an independent consultant not involved with the Quality Assurance (acceptance) activities on the project.

(b) Minimum five (5) years experience in quality control activities in paving operations.

(c) Full authority to institute actions necessary for successful implementation of the ICQCP.

(2) IC Quality Control Technician (ICQCT). The person(s) responsible for conducting quality control and inspection activities to implement the ICQCP. There may be more than one ICQCT on a project.

(a) Full-time employee of the Contractor or an independent consultant with a minimum two (2) years experience in quality control activities in paving operations.

(b) Completed the Department requirements/certification for the applicable testing.

(c) Full authority to institute actions necessary for successful implementation of the ICQCP.

(3) IC Roller Operator(s). The person responsible for operating the IC roller(s) and attached IC equipment. Sufficient training for the roller operator(s) shall be supplied by a representative of the manufacturer of the equipment, according to subsection 411-3.3.d.

b. IC Quality Control Technician Responsibilities. The ICQCT shall be responsible for the following minimum functions:

(1) Daily GPS check testing for the IC roller(s) and rover(s).

(2) Control strip construction as described in Item P-401-3.5, to establish target compaction pass counts and target values for the strength of the materials using the standard testing devices; i.e., Nondestructive density gauges, pavement cores, and IC roller(s).

(3) Monitoring of the construction operations and the IC roller(s) during production and final evaluation operations.

(4) Quality control testing to monitor the pavement temperature and the required level of compaction.

(5) Daily download and analysis of the IC data from the roller(s).

(6) Daily set-up, take down and secure storage of GPS and IC roller components

c. Technical Representative. Provide on-site technical assistance from the IC equipment manufacturer's representative as needed during the project.

d. Training. Provide on-site training for Contractor and Department project personnel on the operation of the IC technology conducted by the IC equipment manufacturer's technical representative or other qualified trainer. Contractor's personnel shall include the IC Field manager or IC Program Administrator, ICQCT, and all roller operator(s). Department personnel shall include

the Project Engineer and field inspector(s). Provide an enclosed facility for the training, with all accommodations required for visual presentations. Training shall be at least 4 hours duration.

Topics shall include the following as a minimum:

(1) Background information for the specific IC system(s) to be used.

(2) Setup and checks for IC system(s), GPS or UTS equipment operation. Operation of the IC systems on the roller, i.e. setup data collection, start/stop of data recording, and on-board display options.

(3) Operation of analysis software to review IC coverage maps, temperature maps, compare point test data, perform statistics analysis, and produce reports for project requirements.

METHOD OF MEASUREMENT

411-4.1 See GCP Section 90. The work under this item will not be measured for payment. Surveying required under this section is subsidiary to Item G-135 Construction Surveying and Monuments.

BASIS OF PAYMENT

411-5.1 Intelligent Compaction for Asphalt Mixtures will be paid at the contract lump sum price.

Payment will be made under:

Item P411.010.0000	Intelligent Compaction for Asphalt Mix Pavement – per lump sum

REFERENCES

AASHTO PP 81	Intelligent Compaction Technology for Embankment and Asphalt Pavement Applications