January 23, 2020

REVISION OF SECTION 614

PEDESTRIAN PUSH BUTTONS

1. **NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions regarding its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by the Standards and Specifications Unit of the Project Development Branch. The instructions for use on CDOT construction projects appear below.

Other agencies that use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use this standard special provision on all projects with Pedestrian Push Buttons, Accessible Pedestrian Signals, and Pedestrian Push Button Assembly Posts.

Section 614 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 614.08(f) and replace with the following:

1. *Pedestrian Push Buttons.* Pedestrian push buttons shall be a piezo, direct push button contact type and shall consist of electronic control equipment, mounting hardware, and push button.

The pedestrian push button shall be weatherproof, tamper-proof, constructed so that it will be impossible to receive any electrical shock under any weather condition, and operate on a voltage not to exceed 24 VAC.

The housing shall be shaped to fit the curvature of the pole to which it is attached to provide a rigid installation. Saddles shall be provided to make a neat fit when required.

Materials for Pedestrian Push Button Post Assembly shall conform to the following:

1. The Pedestrian Push Button Post Assembly, sign, and push button shall conform to the following:
2. The latest version of the ADA Standards for Accessible Design, Chapter 3, Section 309 Operable Parts.
3. Current CDOT adopted Manual of Uniform Traffic Control Devices (MUTCD), Chapter 4E-Pedestrian Control Features.
4. NEMA TS 2 Section 2.1 requirements for Temperature and Humidity, Transient Voltage Protection, and Mechanical Shock and Vibration.
5. IEC 61000-4-4; 4-5 Transient Suppression requirements.
6. FCC Title 47, Part 15, Class A, Electronic Noise requirements.
7. The post for the Pedestrian Push Button Post Assembly shall be aluminum Schedule 40.
8. Wiring for the Pedestrian Push Button Post Assembly shall conform to the manufacturer’s recommendations.
9. A #10 AWG (minimum) bare copper wire shall be used to connect the Pedestrian Push Button to the signal grounding system.
10. For signalized intersection crossings, the system shall have a programmable Extended Push Activation feature with the ability to extend the Walk time. Activation shall be programmable from one to six seconds.

Delete subsection 614.08(g) and replace with the following:

1. *Accessible Pedestrian Signals.* The Accessible Pedestrian Signal (APS) shall be an audible vibro-tactile pedestrian signal system and shall consist of all electronic control equipment, mounting hardware, and push button, designed to provide both a push button with a raised, vibrating tactile arrow on the button as well as a variety of audible indications for differing pedestrian signal functions.

The integrated pedestrian push button shall be weatherproof, tamper-proof, constructed so that it will be impossible to receive any electrical shock under any weather condition, and operate on a voltage not to exceed 24 VAC.

The housing shall be shaped to fit the curvature of the pole to which it is attached to provide a rigid installation. Saddles shall be provided to make a neat fit when required.

Materials for Pedestrian Push Button Post Assembly shall conform to the following:

1. The pedestrian push button post assembly, integrated push button, and sign shall meet the following requirements:
2. The latest version of the ADA Standards for Accessible Design, Chapter 3, Section 309 Operable Parts.
3. Current CDOT adopted Manual of Uniform Traffic Control Devices (MUTCD), Chapter 4E – Pedestrian Control Features.
4. NEMA TS 2 Section 2.1 requirements for Temperature and Humidity, Transient Voltage Protection and Mechanical Shock and Vibration.
5. IEC 61000-4-4; 4-5 Transient Suppression requirements.
6. FCC Title 47, Part 15, Class A, Electronic Noise requirements.
7. The APS pushbutton enclosure shall meet the NEMA 250 – Type 4X enclosure requirement.
8. The post for the Pedestrian Push Button Post Assembly shall be aluminum, Schedule 40.
9. Wiring for the Pedestrian Push Button Assembly shall conform to the manufacturer’s recommendations.
10. A #10 AWG (minimum) bare copper wire shall be used to connect the Pedestrian Push Button Post Assembly to the signal grounding system.
11. For signalized intersection crossings, the system shall have a programmable Extended Push Activation feature with the ability to extend the Walk time and provide an informational audible message. Activation shall be programmable from one to six seconds.

The Accessible Pedestrian Signal shall have the following functional requirements:

1. APS functional features.

The APS shall be programmable and adjustable. Programming and adjustments shall be made using a laptop computer, smart device, or vendor supplied programmer. No additional hardware or equipment shall be required. The APS shall be fully compatible with the three latest versions of the Windows operating platform. The programmable features shall be:

1. Push-button locator tone.
2. Walk and Wait audible message.
3. Audible push-button informational message.
4. Audible crossing beacon.
5. Vibrating, tactile arrow push button.
6. Independent minimum and maximum volume limits for the Locator Tone, Walk, and Audible Beaconing features.

Audible features shall emanate from the pedestrian pushbutton housing. The APS shall utilize digital audio technology, having a minimum 12-bit sample at a 16k Hz sample rate. Total harmonic distortion shall be less than 3 percent at 75 decibels. The APS shall provide independent ambient sound adjustment for the Locator Tone feature. The APS shall allow for Locator Tone volume to be set below the ambient noise level. The system shall have a minimum of three programmable locator tones. All sound levels shall adjust automatically utilizing an internally mounted, interval ambient sensing microphone, in accordance with the MUTCD.

For signalized intersection crossings, the APS shall monitor the Walk condition for conflict operation. As a standalone unit, the APS shall disable the Walk functionality should a conflict be detected.

The APS system shall log cumulative call data. The data shall be date and time stamped, and shall be accessible via laptop or smart device.

For signalized intersection crossings, the system shall provide a programmable audible Wait message when the button is pushed. The message shall only annunciate once per actuation.

1. Power Control Unit (PCU).

The PCU shall be mounted in the pedestrian signal head and shall be powered by the activation of Walk or Don’t Walk using 120 Volts Alternating Current (VAC).

The PCU shall utilize separate power inputs for Walk and Don’t Walk. The PCU shall not require more than four wires from the PCU to the corresponding push button.

1. Push Button Assembly (PBA).

The PBA shall be a single assembly containing an ADA compliant, vibro-tactile (signalized) directional arrow button, weatherproof audible speaker, and informational sign with optional placard braille messages. The PBA housing shall not incorporate any plastic or polycarbonate parts.

The PBA tactile arrow shall be 2 inches in length and shall be field adjustable to two directions.

The push button shall utilize Piezo switch technology rated at greater than twenty million operations. Vibro-tactile operation shall pulse at 20 Hz with a minimum 0.003-inch displacement against a 2 pound applied force.

The PBA assembly shall be capable of mounting on a curved or flat surface utilizing either machine screws or bolts or banding type mounting hardware. The PBA shall accommodate mounting to a minimum 4-inch diameter pole.

Delete paragraph 3 of subsection 614.09(4) and replace with the following:

Prior to start of the installation of a APS, the Contractor shall submit all units for testing. Installation of the APS shall not begin until written approval of each unit has been received from the Engineer. If a unit fails to pass testing, the Contractor shall repair or replace the unit at their expense.

Delete paragraphs 4 and 5 of subsection 614.09(4)

Subsection 614.10(j) shall include the following:

1. A field test of a single APS shall be performed in the presence of the Engineer. All repairs or replacements required to ensure a fully operational system shall be at the Contractor’s expense.

The APS shall be installed in accordance with the manufacturer’s recommendations.

Subsection 614.13 shall include the following:

Pedestrian Push Button will be measured by the actual number that are installed and accepted.

Subsection 614.14 shall include the following:

Payment will be made under:

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| Pedestrian Push Button | Each |