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|  | FDOT Traffic Engineering Research Laboratory (TERL)  ATC 5201 7.7.1-7.10.3 Checklist | By signing this form, the applicant declares that he/she has read and understands the provisions of the *ATC 5201 Standard*. The requirements listed on this checklist are derived from Sections 7.7.1-7.10.3 and are the basis for determining a product’s compliance to these sections of the standard. |

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| --- | --- | --- | --- |
| Date: | Click here to enter a date. | Applicant’s  Name (print): |  |
| Manufacturer: |  |  |  |
| Item, Model No.: |  | Signature: |  |

|  |  | **\*\* Greyed out rows in table below are for TERL use only \*\*** |  |  |  |
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| **ID No** | **Section** | **Requirement** | **Item Comply? (Yes/No/NA)** | **Comments (Applicant must provide information as indicated)** | **TERL Evaluation Method** |
| The following criteria are for the Vibration Tests. | | | | | |
| 1 | 7.8  (NEMA TS2 2.2.8.2) | Test equipment meets the stated requirements. |  |  | Document Review |
|  |  | Init.: |
| 2 | (NEMA TS2 2.2.8.3) | Vibration table is set for a double amplitude displacement of 0.015 inch. |  |  | Document Review |
|  |  | Init.: |
| 3 |  | Vibration table cycles over a search range from 5 to 30 Hz and back with a period of 12.5 minutes. |  |  | Document Review |
|  |  | Init.: |
| 4 |  | Resonant frequency is determined in each of the three mutually perpendicular planes. |  | In the event of more than one resonant frequency in each plane, record the most severe resonance. If resonant frequencies appear equally severe, record each resonant frequency. If no resonant frequency occurs for a given plane within the prescribed range, record 30 Hz. | Document Review |
|  |  | Init.: |
| 5 | (NEMA TS2 2.2.8.4) | Controller is vibrated in each plane at its resonant frequency for a period of 1 hour at an amplitude resulting in 0.5 g acceleration. |  | When more than one resonant frequency has been recorded in accordance with NEMA TS2 Section 2.2.8.3 Item 4, equally divide the test period of 1 hour between the resonant frequencies. The total time of the endurance test is limited to 3 hours, 1 hour in each of three mutually perpendicular planes. | Document Review |
|  |  | Init.: |
| The following criteria are for the Shock (Impact) Tests. | | | | | |
| 6 | 7.9  (NEMA TS2 2.2.9.2) | Test equipment meets the stated requirements. |  |  | Document Review |
|  |  | Init.: |
| 7 | (NEMA TS2 2.2.9.3) | Controller is secured to the test table on one of its three mutually perpendicular planes and the test table is raised to the calibrated height and released from the calibrated height, free falling into the box of energy absorbing material below. |  |  | Document Review |
|  |  | Init.: |
| 8 |  | Drop test is repeated for each of the remaining two mutually perpendicular planes with the same calibrated height. |  |  | Document Review |
|  |  | Init.: |
| 9 |  | With the observations of the accelerometer for the three tests, complete the stated actions for the corresponding observed g’s. |  |  | Document Review |
|  |  | Init.: |
| The following criteria are for the Power Interruption Tests. | | | | | |
| 10 | 7.10 | Power interruption tests are conducted at low (100 VAC) and high (135 VAC) input voltage at -37°C and 74°C. |  | Low voltage is 89 VAC for NEMA units. | Document Review |
|  |  | Init.: |
| 11 | 7.10.1 | Controller cycles and its input voltage is removed for a period of 475 ms and continues normal operation after power restoration, repeated three times. |  |  | Document Review |
|  |  | Init.: |
| 12 |  | Controller cycles and its input voltage is removed for a period of 550 ms and upon restoration of power the controller restart operation begins. |  |  | Document Review |
|  |  | Init.: |
| 13 |  | Controller cycles and its input voltage is removed for a period of 750 ms and upon restoration of power the controller restart operation begins. |  |  | Document Review |
|  |  | Init.: |
| 14 |  | Controller cycles and its input voltage is removed for a period of one second and upon restoration of power the controller restart operation begins. |  |  | Document Review |
|  |  | Init.: |
| 15 | 7.10.2 | Controller’s line voltage is lowered from nominal voltage to 0 VAC at a rate no greater than 2 VAC per second, then it is raised to low voltage at a rate no greater than 2 VAC per second, and upon reaching low voltage the controller resumes normal operation, repeated three times. |  | Low voltage is 89 VAC for NEMA units. | Document Review |
|  |  | Init.: |
| 16 | 7.10.3 | Controller’s power is turned off for 350 ms and on for 650 ms for a period of two minutes and controller continues to function normally, repeated three times. |  | Power interruption is performed through electromechanical contacts of appropriate size for the load. | Document Review |
|  |  | Init.: |
| The following criteria are for the Transients, Temperature, Voltage, and Humidity Tests. | | | | | |
| 17 | 7.7.1  (NEMA TS2 2.2.7.1) | Setup meets the stated requirements. |  |  | Document Review |
|  |  | Init.: |
| The following criteria are for the Transient Tests. | | | | | |
| 18 | 7.7.2  (NEMA TS2 2.2.7.2) | Controller dwells at a voltage of 120 VAC and transient generator is set to a high-repetition noise transient with an amplitude of 300 V ± 5% (positive and negative polarity), a peak power of 2500 W, a repetition rate of one pulse every other cycle moving uniformly over the full wave in order to sweep once every 3 seconds across 360 degrees of line cycle, a pulse rise time of 1 microsecond, and a pulse width of 10 microseconds. |  |  | Document Review |
|  |  | Init.: |
| 19 |  | Controller’s voltage input comes from the transient generator’s output for 5 minutes and repeating for at least two conditions of dwell. |  |  | Document Review |
|  |  | Init.: |
| 20 |  | Controller cycles for 10 minutes without malfunction with the transient generator on. |  |  | Document Review |
|  |  | Init.: |
| 21 |  | Controller dwells at a voltage of 120 VAC and transient generator provides a new high-repetition noise transient with an amplitude of 300 V ± 5% (positive and negative polarity), a source impedance no less than 1000 ohms the nominal impedance, a repetition of one pulse per second for a minimum of five pulses per selected terminal, a pulse rise time of 1 microsecond, and a pulse width of 10 microseconds. |  |  | Document Review |
|  |  | Init.: |
| 22 |  | Controller cycles without malfunction and transient generator’s output is applied to the controller’s input/output terminals. |  |  | Document Review |
|  |  | Init.: |
| 23 |  | Transient generator provides a low-repetition high-energy transient with an amplitude of 600 V ± 5% (positive and negative polarity), an energy discharge source of a 10 µF oil-filled capacitor, a repetition rate of one discharge every 10 seconds, and a pulse position that is random across 360 degrees of line cycle. |  |  | Document Review |
|  |  | Init.: |
| 24 |  | Controller dwells at a voltage of 120 VAC without malfunction and capacitor is discharged ten times for each polarity, repeating for at least two conditions of dwell. |  |  | Document Review |
|  |  | Init.: |
| 25 |  | Controller cycles without malfunction and capacitor is discharged ten times. |  |  | Document Review |
|  |  | Init.: |
| 26 |  | Controller continues its programmed functions without malfunction and doesn’t accomplish the listed failures. |  |  | Document Review |
|  |  | Init.: |
| 27 |  | Controller’s AC power input is from the transient generator with an amplitude of 2000 ± 100 V (positive and negative polarity), a peak power discharge from a 15 µF oil-filled capacitor, and a maximum repetition rate applied to the capacitor once every 2 seconds for a maximum of three applications for each polarity. |  |  | Document Review |
|  |  | Init.: |
| 28 |  | 120 VAC is applied to the controller and the controller goes through its prescribed start-up sequence and cycles in accordance with the programmed functions. |  |  | Document Review |
|  |  | Init.: |
| The following criteria are for the Low-Temperature Low-Voltage Tests. | | | | | |
| 29 | 7.7.3  (NEMA TS2 2.2.7.3) | Controller is operable at room temperature with a low input voltage of 100 VAC. |  | Low voltage is 89 VAC for NEMA units. | Document Review |
|  |  | Init.: |
| 30 |  | Controller cycles and environmental chamber temperature is lowered to -37°C at a rate not exceeding 18°C per hour. |  |  | Document Review |
|  |  | Init.: |
| 31 |  | Controller cycles for a minimum of 5 hours at -37°C with humidity control off without malfunction. |  |  | Document Review |
|  |  | Init.: |
| 32 |  | Controller’s power is removed for a minimum period of 5 hours and upon restoration of power the controller undergoes its prescribed start-up sequence and resumes cycling. |  |  | Document Review |
|  |  | Init.: |
| The following criteria are for the Low-Temperature High-Voltage Tests. | | | | | |
| 33 | 7.7.4  (NEMA TS2 2.2.7.4) | Controller’s input voltage is increased from 100 VAC to 135 VAC while at -37°C and humidity control off. |  | Low voltage is 89 VAC for NEMA units. | Document Review |
|  |  | Init.: |
| 34 |  | Controller cycles for one hour without malfunction. |  |  | Document Review |
|  |  | Init.: |
| The following criteria are for the High-Temperature High-Voltage Tests. | | | | | |
| 35 | 7.7.5  (NEMA TS2 2.2.7.5) | Controller cycles with its input voltage remaining at a voltage of 135 VAC and environmental chamber’s temperature is increased to 74°C at a rate not exceeding 18°C per hour. |  |  | Document Review |
|  |  | Init.: |
| 36 |  | Humidity controls are set to not exceed 95 percent non-condensing over the temperature range of 1.1°C to 46°C. |  |  | Document Review |
|  |  | Init.: |
| 37 |  | Humidity control is set to maintain constant absolute humidity when temperature reaches 42.7°C and controller continues to cycle without malfunction. |  | Relative humidities for wet bulbs are shown in Table 7-1 of the ATC 5201 standard. | Document Review |
|  |  | Init.: |
| 38 |  | Controller cycles without malfunction for a minimum of 15 hours at 74°C and 18 percent relative humidity. |  |  | Document Review |
|  |  | Init.: |
| The following criteria are for the High-Temperature Low-Voltage Tests. | | | | | |
| 39 | 7.7.6  (NEMA TS2 2.2.7.6) | Controller operates without malfunction with its input voltage decreased to a voltage of 100 VAC, the environmental chamber’s temperature remaining at 74°C, the humidity controls remaining at 18 percent relative humidity, and the wet bulb remains at 42.7°C. |  | Low voltage is 89 VAC for NEMA units. | Document Review |
|  |  | Init.: |
| The following criteria are for Test Termination. | | | | | |
| 40 | 7.7.7  (NEMA TS2 2.2.7.7) | Controller cycles and its input voltage is set to 120 VAC. |  |  | Document Review |
|  |  | Init.: |
| 41 |  | Environmental chamber’s temperature is set to room temperature, 20°C to 27°C, at a rate not exceeding 18°C per hour and humidity control is off. |  |  | Document Review |
|  |  | Init.: |
| 42 |  | Controller cycles without malfunction and controller operates without malfunction after 1 hour, allowing for stabilization at room temperature. |  |  | Document Review |
|  |  | Init.: |

**Document History for:**

**ATC 5201 7.7.1-7.10.3 Checklist**

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| --- | --- | --- | --- | --- | --- | --- |
| Rev | Description | Authored and Checked | Reviewed | Approved | Approval Date | Rev More Stringent? |
| 1.0 | New checklist | A. Cramer | W. Geitz  D. Bremer | D. Vollmer | 06/02/2025 | N/A |
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