

## Evaluation Table

<b>PEP ID:</b>	<b>XXXXX</b>
<b>Manufacturer:</b>	<b>Name of Manufacturer</b>
<b>Product Name:</b>	<b>Name of Product</b>

733 Signal Indications and Mounting Assemblies

733 LED Traffic Signals

ADOT Standard Specification: 733

ADOT Standard Drawing: T.S. 8 Series

Responsible Section: Traffic Group

<b>Material Property</b>	<b>Specification/ Test Method</b>	<b>Requirement</b>	<b>Results</b>	<b>Pass/ Fail</b>
Traffic Signal: MUTCD and ITE Requirement	T.S 8-0	All signals shall meet or exceed the applicable requirements of MUTCD and ITE Equipment and material Standards.		
Traffic Signal: ITE Requirement	T.S 8-0	The ball indications shall conform to the 2005 ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode Circular Signal Supplement" (VTCSH-LED).		
Traffic Signal: ITE Requirement	T.S 8-0	The Arrow Indications shall conform to the 2008 ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode Vehicle Arrow Traffic Signal Supplement".		
Traffic Signal: ITE Requirement: Labeling	T.S 8-0	The LED ball and arrow modules shall be certified or listed and permanent labeled on the back of each module as meeting the applicable ITE specification per a third party verification program (e.g. Intetek ETL or equal).		
Traffic Signal: Temperature Testing	T.S 8-0	Report Only, Not Required: It is desirable to have signal indication module units certified per the upper ITE specification limit of 81 degrees C (178 degrees F) temperature, instead of the standard 74 degrees C (165 degrees F).		

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Traffic Signal: Compatibility	T.S 8-0	All units shall also be certified or tested for load switch and conflict monitor compatibility (per ITE specification technical note No. 3). A list of incompatible load switches or conflict monitors, if and as applicable, shall be supplied if requested.																																			
Traffic Signal: Transient Suppression	T.S 8-0	Both the ball and arrows shall have transient suppression capabilities which exceed the ITE arrow specification requirement.																																			
Traffic Signal: EPACT of 2005	T.S 8-0	All red and green traffic signal units shall conform to the applicable requirements of the Energy Policy Act of 2005 (EPACT of 2005). See below.																																			
<table border="1"> <thead> <tr> <th colspan="3">Electrical Energy Efficient Criteria of EPACT of 2005 (See Note 13)</th> </tr> <tr> <th>Traffic Signal Face Module Type</th> <th>Maximum Wattage at 74 degrees C / 165 degree F</th> <th>Maximum Wattage at 25 degrees C / 77 degree F</th> </tr> </thead> <tbody> <tr> <td>8" Red Ball</td> <td>13</td> <td>8</td> </tr> <tr> <td>8" Yellow Ball</td> <td>N/A</td> <td>16 - N/A *</td> </tr> <tr> <td>8" Green Ball</td> <td>12</td> <td>12</td> </tr> <tr> <td>12" Red Ball</td> <td>17</td> <td>11</td> </tr> <tr> <td>12" Yellow Ball</td> <td>N/A</td> <td>22 - N/A *</td> </tr> <tr> <td>12" Green Ball</td> <td>15</td> <td>15</td> </tr> <tr> <td>12" Red Arrow</td> <td>12</td> <td>9</td> </tr> <tr> <td>12" Yellow Arrow</td> <td>N/A</td> <td>16 - N/A *</td> </tr> <tr> <td>12" Green Arrow</td> <td>11</td> <td>11</td> </tr> </tbody> </table> <p>N/A - No requirements for yellow have been issued yet. * - Maximum wattages are an ADOT requirement.</p>					Electrical Energy Efficient Criteria of EPACT of 2005 (See Note 13)			Traffic Signal Face Module Type	Maximum Wattage at 74 degrees C / 165 degree F	Maximum Wattage at 25 degrees C / 77 degree F	8" Red Ball	13	8	8" Yellow Ball	N/A	16 - N/A *	8" Green Ball	12	12	12" Red Ball	17	11	12" Yellow Ball	N/A	22 - N/A *	12" Green Ball	15	15	12" Red Arrow	12	9	12" Yellow Arrow	N/A	16 - N/A *	12" Green Arrow	11	11
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Traffic Signal: Energy Star	T.S 8-0	All units shall be Energy Star qualified and the manufacturer shall adhere to the applicable Energy Star partnership agreement requirements for traffic signals.																																			
Traffic Signal: Plastics	T.S 8-0	All plastics shall be UV stabilized and shall be rated for a minimum 5-year outdoor service life.																																			

<b>Material Property</b>	<b>Specification/ Test Method</b>	<b>Requirement</b>	<b>Results</b>	<b>Pass/ Fail</b>
Traffic Signal: Plastics	T.S 8-0	They (plastics) shall not embrittle, crack, cloud, glaze and yellow within that time frame.		
Traffic Signal: Lenses	T.S 8-0	Lenses shall be hard coated for enhanced durability.		
Traffic Signal: Gasket	T.S 8-0	All LED modules shall include a continuous neoprene type gasket which shall assure a weather and dust proof seal between the unit and the section door.		
Traffic Signal: Sun Phantom	T.S 8-0	The units shall be designed to reduce the chance of sun phantom. This includes having a lens design (for pixilated units) or an optical assembly design (incandescent look or non-pixilated illumination units) that is specifically configured and tested to prevent or minimize the occurrence of sun phantom.		
Traffic Signal: Arrow Icons	T.S 8-0	All arrow icons shall be omni-directional. A label on the back of the signal module shall state that.		
Traffic Signal: Span Wire Applications	T.S 8-0	All signal (ball, arrow and program visibility) indications shall also be physically and optically suitable for span wire applications.		
Traffic Signal: Voltage	T.S 8-0	The units shall be rated to operate at 120 VAC.		
Traffic Signal: Wire	T.S 8-0	The minimum wire size for the unit connection conductors shall be #18 AWG.		
Traffic Signal: Warranty	T.S 8-0	The traffic signal housing, visor, and backplate shall have at least a one-year warranty against defects in materials and workmanship. (full replacement)		
Traffic Signal: Warranty	T.S 8-0	The LED traffic signal units shall have a minimum of 3-year warranty. (full replacement)		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Traffic Signal: Serial Number	T.S 8-0	All units shall have a unique serial number that is expressed on a permanent label in writing and bar code on the back of the unit.		
Traffic Signal: Louvers	T.S 8-0	All backplates shall be louvered. Size, number, location and configuration of those louvers can vary.		
Traffic Signal: Fabrication	T.S 8-0	The backplates shall be fabricated from 16 gauge aluminum as a minimum.		
Traffic Signal: Backplates	T.S 8-0	All backplates shall be one piece aluminum except for the type Q-2 which shall have no more than three sections total.		
Traffic Signal: Backplate Frame	T.S 8-0	The width of the backplate frame around 12 inch signals shall be 5 inches with 8 inches for 8 inch signals.		
Traffic Signal: Finish	T.S 8-0	The backplates shall be powder coated or painted a minimum of two coats of dull black paint. (Federal Standard (FS) 595A b 37038)		
Traffic Signal: Finish	T.S 8-0	The finish achieved shall have a minimum outdoor weathering rating of 12 or more years.		
Traffic Signal: Indication Size	T.S 8-1	Type B signal face shall be 8-inch indications. All others shall be 12-inch indications. (8-inch signal face indications shall normally only be used for flashers and ramp meters)		
Traffic Signal: Ramp Metering	T.S 8-1	Report Only: Ramp metering assemblies may be required to have "tattle tell lights".		
Housing: Definition	T.S. 8-4 (2 of 4)	A traffic signal housing consists of a body, hinged gasketed door, terminal block (as applicable) and related hardware. A signal face indication (ball or arrow) module and visor are added to the housing to make a section.		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Housing: MUTCD and ITE Requirement	T.S. 8-4 (2 of 4)	The traffic signal housing shall meet or exceed the applicable requirements of MUTCD and ITE Equipment and Materials Standards Chapter 2 Vehicle Traffic Control Signal Heads Section 3.0 Physical and Mechanical Requirements and Section 4.0 Housing, Door and Visor.		
Housing: Fabrication	T.S. 8-4 (2 of 4)	The housing body shall be one-piece die cast or molded cast aluminum unit.		
Housing: Compatibility	T.S. 8-4 (2 of 4)	The housing shall be compatible to accept ITE VTCSH-LED compliant LED traffic signal face modules.		
Housing: Backplate Mounting	T.S. 8-4 (2 of 4)	The back of the body shall be provided with four pre-drilled and tapped holes for backplate mounting.		
Housing: Terminal Block Mounts	T.S. 8-4 (2 of 4)	The body shall have terminal block mounts cast into the back wall.		
Housing: Door	T.S. 8-4 (2 of 4)	The housing door shall be a one-piece die cast or molded cast aluminum with two captive ¼ inch stainless steel eyebolts with wing nuts (wingnut eyebolt assembly) to latch the door to the body.		
Housing: Door Seal	T.S. 8-4 (2 of 4)	Once latched, the door shall form a positive dust and weather proof seal between the door and body via a neoprene or similar suitable synthetic rubber gasket material which is rated for outdoor use.		
Housing: Door Molded Gasket Channel	T.S. 8-4 (2 of 4)	The gasket shall be fitted into the molded gasket channel cast into the perimeter of the door or housing.		
Housing: Door Holes	T.S. 8-4 (2 of 4)	The door shall be provided with four tapped and threaded holes on the front and back, per a standard layout.		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Housing: Door Holes	T.S. 8-4 (2 of 4)	The holes shall accept a 3/16 inch stainless steel screw.		
Housing: Back Screws	T.S. 8-4 (2 of 4)	The screws on the back shall also include four ITE VTCSH compliant LED traffic signal face module holding clips.		
Housing: Finish	T.S. 8-4 (2 of 4)	All exterior portions of the body and door shall be powder coated or painted a minimum of two coats of dull black paint. (Federal Standard (FS) 595A b 37038)		
Housing: Finish	T.S. 8-4 (2 of 4)	The finish achieved shall have a minimum outdoor weathering rating of 12 or more years.		
Housing: Exterior Hardware	T.S. 8-4 (2 of 4)	All exterior hardware such as hinge pins, bolts, screws, washers and locking wing nuts shall be stainless steel.		
Housing: Interior Hardware	T.S. 8-4 (2 of 4)	All interior screws, fittings, washers, bolts, connectors, terminal blocks shall be stainless steel, plated steel aluminum or brass that is corrosion resistant.		
Section: Connection	T.S. 8-4 (3 of 4)	Sections shall be connected together with 3 carriage bolts (1/4-20 x 1 3/4 to 2 inch length), 2 clamping washers, and 3 hex nuts, common to makes of ITE compliant signal housings. (bolt length may vary)		
Section: Terminal Block	T.S. 8-4 (3 of 4)	As a minimum, one spade type four position, two sided removeable terminal block shall be provided per traffic signal face assembly. Additional or larger capacity terminal blocks are to be provided as needed.		
Section: Terminal Block	T.S. 8-4 (3 of 4)	Each terminal block shall be secured to the back inside wall body with two stainless steel screws.		

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Visors: MUTCD and ITE Requirements	T.S. 8-4 (4 of 4)	The visors shall meet or exceed the applicable requirements of MUTCD and ITE Equipment and Materials Standards Chapter 2 Vehicle Traffic Control Signal Heads Section 3.0 Physical and Mechanical Requirements and 4.03 Visors and 4.04 Materials and Fabrication subsections of Section 4.00 Housing, Door, and Visor.		
Visors: Hardware	T.S. 8-4 (4 of 4)	The visors shall be secured to the face of the vehicle traffic signal housing door with four 3/16 inch stainless steel screws.		
Visors: Fabrication	T.S. 8-4 (4 of 4)	Visors shall be fabricated from 3003 H-16 or similar suitable aluminum alloy.		
Visors: Visor Options	T.S. 8-4 (4 of 4)	Report Only – Visor Options: Tunnel visors are to be used unless specified otherwise by the plans or the Engineer. The angle visors are to be used if there is a concern regarding conflicting indication visibility between phase overlaps. Special visors can be used if specified on the plans.		
Visors: Finish	T.S. 8-4 (4 of 4)	All sides and mounting tabs of the visor shall be powder coated or painted a minimum of two coats of dull black paint. (Federal Standard (FS) 595A b 37038)		
Visors: Finish	T.S. 8-4 (4 of 4)	The finish achieved shall have a minimum outdoor weathering rating of 12 or more years.		
Visors: Interchangeable	T.S. 8-4 (4 of 4)	Visor shall be interchangeable between approved signal housing manufacturers.		