B. Each signal section shall have internal reinforcing webs adjacent to the mounting holes or aluminum support plates to provide additional strength and rigidity. The support plates shall be approximately the same size and shape as the signal cross-section and shall be provided as described below:

(1) For mounting with an elevator plumbizer, one support plate shall be provided inside the red signal section at the bottom and one support plate shall be provided inside the yellow signal section at the top. If called out on the bid request the plates may be required between the yellow and green sections instead of between the red and yellow sections.

(2) For mounting with a rigid fitting at the top, one support plate shall be provided outside the red section on top and one support plate shall be provided inside the red section at the top.

(3) For rigid mounting on a pedestal, one support plate shall be provided outside the bottom section at the bottom and one support plate shall be provided inside the bottom section at the bottom.

(4) For span wire mounting, two support plates shall be provided outside, one on top of the top section and one on the bottom of the bottom section. One support plate shall be provided inside the top section at the top and one support plate shall be provided inside the bottom section at the bottom.

C. The signal doors shall be screw injection molded of polycarbonate resin. The doors shall be hinged to the body section on the left side via stainless steel hinge pins and shall be equipped with a substantial screw or wing nut type fastener of stainless steel material on the right side to provide a secure closure means. Both the hinge and closure device shall be internal to the signal body and shall not protrude from the body side in any way. Both the hinge pins and the closing fasteners shall be held captive to the door for ease of maintenance. In the closed position, the hinge pins shall be positively locked in place to preclude their falling out due to vibration. Each door shall be quipped with a molded groove to accommodate a visor in such a way as to prevent any possibility of light escaping between the door and the visor.

D. Each door shall be fitted with a tunnel type visor which shall uniformly surround the upper portion of the lens. All visors shall be of polycarbonate resin and shall be molded with tabs which shall protrude through the signal door such that all visor mounting hardware shall be internal to the assembly and which shall provide a positive locking means of attachment, but which shall allow their easy removal or replacement. Visors which are fastened by screws to the outer face of the door are specifically prohibited. Signal head assemblies shall be supplied with all visors attached.

E. Lenses shall be molded of polycarbonate material and shall conform to the specifications of the INSTITUTE OF TRANSPORTATION ENGINEERS. The lens arrangement shall be as specified on the bid document. Where arrow lenses are specified, the arrow indication shall be provided by means of an aluminum mask installed behind the lens. The mask shall be held securely, however it shall be possible to rotate or replace the mask easily to provide for future needs. Each lens shall be gasketed to prevent the entrance of dust or moisture into the optical portion of the signal. All gaskets shall be rubber. Refer to Section 2, Part 3.0 – "LED Red Traffic Signal Lens" for the red lens requirements.

F. Each signal section shall be equipped with a highly polished, parabolic reflector molded of polycarbonate resin, aluminized on its reflecting surface. The reflector shall be a one piece component which shall hinge to the body section in such a manner as to be positively located when the signal door is in a closed position but yet shall be easily accessed for cleaning. Reflectors which mount to the door assembly are specifically prohibited. The reflector shall accommodate a lamp receptacle meeting the specifications of the INSTITUTE OF TRANSPORTATION ENGINEERS and shall be arranged such that proper lamp filament rotation shall be easily accomplished. Signals sections shall be designed to accommodate lamps having a light center length of 3 inches. No spring or pressure type fasteners which require removal during relamping or filament positioning shall be permitted. Refer to Section 2, Part 3.0 – "LED Red Traffic Signal Lens" for the red lense requirements.

G. The optical portion of the signal head shall be designed as a unit to prevent sun phantom. Refer to Section 2, Part 3.0 – "LED Red Traffic Signal Lens" for the red lens requirements.

H. Each signal head shall be equipped with one or more terminal blocks to facilitate the electrical hookup. All terminal blocks shall be separate and removable components which shall provide minimum 8 – 32 screws for all wiring connections. No "Fast-On" terminals shall be permitted. Signal head assemblies of three or fewer sections shall include one terminal block; four and five section signals shall include two terminal blocks.

I. All internal signal head wiring shall be color coded appropriately to indicate the function of each lead without the need to individually trace each.

J. The housing shall be yellow with signal doors and visors a flat black. No painting shall be permitted. Color must be molded completely through the polycarbonate material and shall not require painting in future years.

K. All signals shall be shipped assembled with visors attached. Visors shall be tunnel design for all signal heads.

L. The front of each signal section shall be square in appearance to provide maximum target value.

13.0 12" POLYCARBONATE PEDESTRIAN SIGNAL HEADS:

A. A pedestrian signal shall consist of two identical sections, one to indicate "Walk" and the other to indicate "Don't Walk" when illuminated by a single standard incandescent traffic signal lamp contained in each section. The design of the signal shall be such that the two sections can be held firmly together in a manner that they can be readily disassembled and reassembled for repair and revision.

B. The signal housing shall be screw injection molded of polycarbonate resin and shall be of sectional construction. The top and bottom of each section shall include mounting holes sized to accommodate standard 1 1/2 inch signal mounting hardware. Each mounting hole shall be surrounded with molded-in serrations to provide a positive lock between the individual sections of the signal and between the signal head assembly and the mounting bracketry. The serrations shall provide 5 degree increments of adjustment to allow proper aiming of the signal. Signal sections shall be joined together with a minimum of four bolts and locknuts located in a manner so as to distribute stress equally over the body ends. The inside surface of each section end shall be essentially smooth and flat. Any webbing or other protrusions which prevent the use of standard signal mounting hardware or which obstruct the operation of normal installation tools shall be cause of rejection.

C. The signal doors shall be screw injection molded of polycarbonate resin. The doors shall be hinged to the body section on the left side via stainless steel hinge pins and shall be equipped with a substantial screw or wing nut type fastener of stainless steel material on the right side to provide a secure closure means. Both the hinge and closure device shall be internal to the signal body and shall not protrude from the body side in any way. Both the hinge pins and the closing fasteners shall be held captive to the door for ease of maintenance. In the closed position, the hinge pins shall be positively locked in place to preclude their falling out due to vibration. Each door shall be equipped to accommodate a visor in such a way as to prevent any possibility of light escaping between the door and the visor.

D. All housings and doors shall be interchangeable.

E. The housings shall be yellow with signal doors and visors a flat black. No painting shall be permitted. Color shall be molded completely through the polycarbonate material to eliminate any future painting.

F. Each door shall be fitted with a tunnel type visor which shall uniformly surround the top and sides of the lens. All visors shall be molded of polycarbonate resin and shall be fastened securely to the door in such a fashion as to permit their easy removal or replacement. Signal head assemblies shall be supplied with all visors attached.

G. Each lens shall be flat with a smooth outside surface. When not illuminated, the lettering on each lens shall be well obscured. The lettering shall be in a straight line with a minimum height of 4-1/2" and a 7/16" wide stroke. Lettering style shall conform to the Institute of Transportation Engineers adjustable face pedestrian signal head standard.

H. The lenses shall be lettered "Don't Walk" and "Walk". "Don't Walk" lenses shall be portland orange in color and "Walk" lenses shall be lunar white in color. Lenses must be of polycarbonate material and shall conform to the Institute of Transportation Engineers adjustable face pedestrian signal head standard.

I. The lenses shall be gasketed with a rubber gasket to exclude dust and moisture. The lens, reflector, socket and gasketing must make a waterproof assembly.

J. Each signal section shall be equipped with a highly polished, parabolic reflector of ALZAK aluminum. The reflector shall be a one piece component which shall mount securely to the door. The reflector shall accommodate a lamp receptacle meeting the specifications of the INSTITUTE OF TRANSPORTATION ENGINEERS and shall be arranged such that proper lamp filament rotation shall be easily accomplished. Signals shall be designed to accommodate lamps having a light center length of 3 inches. No spring or pressure type fasteners which require removal during relamping or filament positioning shall be permitted.

K. Each section shall have a visor (minimum 8") which shall be square in appearance.

L. All signals shall be adjustable and shall contain a terminal block in each head.

M. All gaskets shall be rubber.

N. All signals shall be shipped assembled with visors attached.

O. The optical unit shall provide for anti-sun phantom with the lenses having black opaque backgrounds.

P. If available, the manufacturer shall supply extra aluminum support plates in the top of the top section when the bid request calls for no brackets and in the bottom of the bottom section when the bid request calls for a one-way post top mount.

Q. Each signal head shall be equipped with a terminal block to facilitate the electrical hookup. All terminal blocks shall be separate and removable components which shall provide minimum 8 – 32 screws for all wiring connections. No "Fast-On" terminals shall be permitted.

R. All internal signal head wiring shall be color coded appropriately to indicate the function of each lead without the need to individually trace each.

14.0 BRACKETS AND MOUNTING ATTACHMENTS: Brackets, clamps, etc., shall be furnished in accordance with the details on the plans or items listed in the bill of materials. The contractor shall be responsible to advise the supplier of the exact intent of the plans with regard to proposed signal mounting combinations and their corresponding signal orientations and signal head types as well as the requirements for other appurtenances such as cabinets or signs. In this manner, it is intended that all fittings, spacers, bolts, clamps, etc., shall be furnished in sufficient quantity to effect complete mounting of the signal head(s) or other appurtenances whether or not each individual element is delineated or itemized on the plans.

A. BRACKET ASSEMBLIES: Bracket assemblies shall conform to the following provision unless otherwise noted on the plans.

(1) Construction shall be approved polycarbonate materials or cast aluminum. Polycarbonate brackets shall be screw-injection molded polycarbonate resin.

(2) Provisions shall be made for accepting and directing wire feeds coming from inside the signal support pole.

(3) Bracket color shall be federal yellow. Aluminum brackets shall be shop painted. No painting shall be permitted on the polycarbonate brackets. Color must be molded completely through the polycarbonate material and shall not require painting in future years.

B. POLE MOUNTED FITTINGS: Pole mounted fittings shall be cast aluminum or approved polycarbonate materials.

C. BANDING MATERIAL: Banding materials shall be stainless steel of a width as recommended by the supplier (generally 3/4" minimum) with stainless steel buckles.

15.0 PEDESTRIAN PUSHBUTTON WITH SIGN: The pedestrian pushbutton with sign assembly shall be supplied as a complete single unit. All steel parts shall be coated to prevent rust. The following requirements shall also be met:

(1) The unit shall be weatherproof and dustproof.

(2) The electrical contacts shall be rated at a minimum of 35 amps at 12 volts.
(3) The pushbutton shall be threaded for installation into the cup from the rear of the unit.
(4) The legend "Push Button – Wait for Walk Signal" shall be cast into the face of the cast aluminum plaque.
(5) Banding brackets built in at the top and bottom of the unit.
(6) The back of the unit shall be curved with a four (4) inch radius.

16.0 RIGID GALVANIZED STEEL CONDUIT: All conduit and fittings shall be hot dipped galvanized rigid steel conduit, UL approved, and meet federal specifications WWC-581-D or American Standard #C80-1. All conduit runs shall be electrically bonded by a grounding bushing and a #6 solid bare copper wire.

17.0 SPAN WIRE: Span wire shall be 3/8" diameter Siemens-Martin Grade, minimum, meeting specifications in ASTM A475.

18.0 TETHER WIRE: Tether wire shall be 1/4" diameter Siemens-Martin Grade, minimum, meeting specifications in ASTM A475.

19.0 STREET NAME SIGNS: Materials and manufacture of street name signs shall meet the requirements given on the "Summary of Traffic Signal Quantities" sheet.

20.0 VEHICLE DETECTOR LOOP WIRE SEALANT:

A. The saw slot filler and encapsulant shall be a one-part polyurethane compound requiring no mixing, measuring or application of heat prior to or during its installation. It shall be intended for sealing and protecting vehicle detector loop wires installed in sawcuts 1/4" to 3/8" wide with sufficient depth to provide a minimum 1" sealant cover above the top wire.

B. The encapsulant is intended to provide compressive yield strength to withstand normal vehicular traffic as well as sufficient flexibility to withstand normal movement in asphaltic and concrete pavements, while protecting the loop wire from moisture penetration, fracture and shear.

C. The encapsulant shall be designed for roadway installation when air temperature is between 40 degrees and 140 degrees F and enable vehicular traffic to pass over the sawcut immediately after installation without tracking or stringing of the material. The encapsulant shall form a surface skin allowing exposure to vehicular traffic within 30 minutes at 75 degrees and completely cure to a tough, rubber-like consistency in two (2) to seven (7) days after installation.

D. Cured encapsulant shall exhibit resistance to effects of weather, vehicular abrasion, motor oils, gasoline, antifreeze solution, brake fluid, deicing chemicals and salt normally encountered in such a manner that the performance of the vehicle detector loop wire is not adversely affected.

E. Filling of the sawcut shall be in accordance with the directions of the manufacturer.

21.0 NUTS AND BOLTS: When used in a mast arm attachment to the pole or in anchoring the pole to concrete base, the nuts and bolts shall be rated high strength and conform to section 1613, Type II of the Standard Specification, Edition 1990. An anti-seize compound shall be used on all bolts, screws, etc.

SECTION 3: CONTRACTOR REQUIREMENTS

1.0 ELECTRICAL CONTRACTORS AND SUB-CONTRACTORS: Electrical contractors and sub-contractors shall be pre-approved by Sedgwick County, Kansas, prior to performing electrical work of any kind on the project. Electrical work includes, but is not limited to, any wiring, lighting, electronic traffic control devices, trenching or conduit placement for electrical wiring.

Pre-approval by Sedgwick County requires:

(A) The electrical contractor or sub-contractor shall have on his payroll an electrician holding a master electrician license recognized and accepted by the Sedgwick County Department of Planning and Code Enforcement.

(B) The electrical contractor or sub-contractor shall have on his payroll an electrician capable of working on any specialized electronic equipment called for in the plans or specifications. In the case of traffic signals, proof of having attended and completed school(s) on the type of controllers (NEMA or Type 170) specified in the plans or specifications shall be required at or before the time that bids are opened for the project. Certification(s) of completion must be on file with the Bureau of Public Services.

(C) All pole/mastarm installation and wiring installation & termination, including wire pulling, loop installation, pole/pedestal & signal head installation, cabinet wiring, and power supply wiring, shall be performed only when the contractor or sub-contractor provides on site an employee holding a Level II certification as a traffic signal electrician or technician as granted by the International Municipal Signal Association (IMSA). All other work shall be performed only when the contractor or sub-contractor provides on site an employee holding at least a Level I certification as an associate traffic signal technician as granted by the IMSA.

A copy of the necessary certification(s) must be on file with the Bureau of Public Services.

(D) The electrical contractor or sub-contractor shall meet any other applicable requirements to perform work as required by the Sedgwick County, Kansas, Department of Planning and Code Enforcement.

(E) Prior to the date that bids are opened for the project, the electrical contractor or sub-contractor shall be on the Kansas Department of Transportation's list of pre-approved contractors for electrical work as detailed in the plans or specifications. A copy of the KDOT certification letter must be on file with the Bureau of Public Services.

Any electrical contractor or sub-contractor that does not meet the requirements as stated above shall not be allowed to perform work on the project.

TRAFFIC SIGNAL SPECIFICATIONS

PREPARED BY
SEDGWICK COUNTY BUREAU OF PUBLIC SERVICES
HIGHWAY DIVISION

DAVID C. SPEARS, P.E. DIRECTOR/COUNTY ENGINEER

REVISED	SCALE	DESIGNED	TRACED	CHECKED	SHEET NO.
				WDH	
	DATE				
	PLANFILE		TOTAL SHEETS		

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