



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
 DNR90044

PAGE
 1

ADDRESS CORRESPONDENCE TO ATTENTION OF
 KRISTA FERRELL
 304-558-2596

RFQ COPY
 TYPE NAME/ADDRESS HERE

VENDOR

SHIP TO

DIVISION OF NATURAL RESOURCES
 PROCUREMENT OFFICE
 CAPITOL COMPLEX
 BUILDING 3, ROOM 630
 CHARLESTON, WV
 25305 304-558-3397

DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS
11/01/2007				
BID OPENING DATE: 11/20/2007		BID OPENING TIME 01:30PM		

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 2		
				THIS ADDENDUM IS ISSUED TO:		
				1.) REVISE/ADD SPECIFICATION SECTIONS: 03300, 07430, 13122, AND 13930		
				2.) INCORPORATED APPROVED EQUALS INTO SPECIFICATIONS PER THE ATTACHED		
				3.) ANSWER QUESTIONS SUBMITTED PRIOR TO THE OCTOBER 26, 2007 DEADLINE FOR TECHNICAL QUESTIONS.		
				4.) TO ADD MANDATORY PRE-BID ATTENDEE LIST INADVERTENTLY OMITTED FROM ADDENDUM NO. 1		
				5.) EXTEND THE BID OPENING DATE		
				6.) TO ADD THE FOLLOWING DRAWINGS TO THE BID DOCUMENTS: SK-1, SK-2, SK-3, SK-4		
				BID OPENING DATE IS EXTENDED TO: NOVEMBER 20, 2007		
				BID OPENING TIME REMAINS: 1;30 PM		
				***** END ADDENDUM NO. 2 *****		
0001	1	LS		968-20		
				RECREATION BUILDING AT CHEIF LOGAN STATE PARK		

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE		TELEPHONE	DATE
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

**GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)**

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division.
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125.00 registration fee.
5. All services performed or goods delivered under State Purchase Orders/Contracts are to be continued for the term of the Purchase Order/Contract, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, this Contract may be deemed null and void, and terminated without further order.
14. **HIPAA Business Associate Addendum** - The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Covered Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Complete all sections of the quotation form.
4. Unit prices shall prevail in cases of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications.

SIGNED BID TO:

Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

October 31, 2007

TO: ALL BIDDERS

**REF: CHIEF LOGAN STATE PARK LODGE AND CONFERENCE CENTER
PROPOSED RECREATION CENTER
RFQ-DNR90044**

SUBJECT: ADDENDUM No. 2

This Addendum Bulletin shall be incorporated in the Construction Contract Documents including the Drawings and Specifications for the Project referenced above. All work amended as listed herein shall be included in your Bid Proposal and the bidder shall acknowledge this addendum on the Bid Form.

The Construction Contract Documents shall be amended as follows:

CHANGE DATE FOR BID OPENING:

Bid opening date shall be Wednesday, November ~~16~~²⁰, 2007 at 1:30 pm.

SPECIFICATIONS

Revised or added Specification Section: 03300, 07430, 13122, and 13930 are included in this addendum.

REQUEST FOR SUBSTITUTION

The attached request for substitution by Summit Electric is approved with the exception of the L and L1 fixtures which are not suitable for the corrosive atmosphere in the Natatorium.

FOR CLARIFICATION / INFORMATION

General Notes:

The 4 NL lights in the Natatorium will be L1 fixtures. They are shown on sheet E1.2.

C 2.1 and C2.2: The true scale of the drawings on each of these sheets is 1"=50'. The bar scale on Sheet C2.2 is incorrect it should show 1'=50' instead of 1"=8'

Questions and Answers:

Q. Building Specifications.

A. Building specifications as well as specifications for insulated wall and roof panels for the pool side of the building have been included with this addendum.

Q. Plain Curb Detail on Sheet C5.1, please identify where this is to be installed at the site drawing do not indicate any curb.

A. There is no concrete curb in this contract.

Q. Please provide details for "Temporary Construction Entrance" shown on C3.1

A. A detail of the Temporary Construction Entrance is included with this addendum.

Q. Specification 01500. 1.13 indicates we are to provide security and to coordinate this with the owner's security program. Please be specific on what you desire and who pays for it.

A. The contractor should supply security at the job site to the degree necessary to satisfy himself that his equipment and materials are secure from vandalism or theft. Since this is a State Park any security forces supplied by the contractor should coordinate there activities with the State Park officials. The contractor will be responsible for the costs of his security forces.

Q. Specification 01500 1.10 indicates we are to install barriers from entry to construction area. Are we to temporary fence the site? Please clarify.

A. The contractor is to install temporary fencing such as orange barrier fences. The fenced area required will be along the roadway parallel to the front of the building and will encompass the entire building site. The contractor will also be required to place temporary fencing around any excavations which are left open after construction has ended for the day.

Q. Specification section 01570 3.2 indicates we are to repair existing roadway after completion as designated on plans. The plans do not indicate any such work and the existing road as of this date is already in question? Please clarify what is expected here.

A. The contractor is only responsible for roadway repairs where his work has caused damage to the roadway. If the contractor protects the existing roadway and no damage to the pavement is occurs, no repairs would be necessary.

Q. Specification section 02200, 3.7 and 3.10 implies the contractor is responsible for replacing unsuitable existing sub grade material. Please clarify.

A. The sub grade materials within the building foot print have been addressed therefore the building foot print area does not apply to this statement.

Q. Is a soil report available?

A. Soil borings were performed and the site was prepared for the building. Soil borings and reports are therefore not applicable to the proposed work by the contractor.

Q. Is Builders Risk required?

A. The contractor shall supply all insurance and bonds as required by the contract documents.

Q. Will head and jamb and sill details be provided for these two doors? (Section 08331)

A. See SK-3 for head and jamb details. It is important to note that the interior partition walls are non-load bearing. Any required additional support for these doors must be provided by framing contractor in the partition wall construction.

Q. Item 2.3 A & B call for integral frame, wood fascia, and sill. Integral frame is also mentioned at 2.7 E. Item 2.7 F asks for no sill and item 2.7 E1 asks for face of wall mounting. Please clarify.

A. Please provide a face of wall installation, without a sill. Unit will need to close flush to the laminated counter provided (see SK-1 and SK-2 for Revisions) and provide the ability to be lock in the closed position. Coil and tracks to be installed on office side of wall and does not require a wood fascia.

Q. Will head and jamb details be provided for the one sectional door under spec section 08361 sectional doors?

A. Head and jamb details are the responsibility of the metal building supplier. Door supplier is required to coordinate all details with building supplier for proper installation.

Q. Is low headroom track the required track for lift type and clearances available at the site for spec section 08361 sectional doors.

A. This would depend on the manufactures required headroom clearances and operational standards and is the requirement of the supplier to determine minimum allowable clearances based on the floor to floor and structural members dimensions provided in the contract documents.

Q. Provide specs on acrylic and epoxy paints.

A. Acrylic paint for tennis court top surface is to provide by building owner and should be removed from Contractor's bid package. Contractor is required to provide owner up to the 1 1/2" DOT #404 Bituminous asphalt with 100% limestone coarse aggregate layer as shown on A1.7 – all acrylic top coats will be provided by owner. See Epoxy paint requirements are below based on substrate material and are based on Sherwin-Williams paints.

Epoxy System (Solvent Base)**Drywall Applications:****a. Eg-Shel Finish**

1st Coat: S-W PrepRite® 200 Latex Primer, B28W200
(4 mils wet, 1.2 mils dry)

2nd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75

3rd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75
(2.5-4 mils dry per coat)

CMU Applications:**a. Eg-Shel Finish**

1st Coat: S-W Heavy Duty Block Filler, B42W46
(18 mils wet, 10 mils dry)

2nd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75

3rd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75
(2.5-4 mils dry per coat)

Metal - (Galvanized) Applications:**a. Eg-Shel Finish**

1st Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75

2nd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75
(2.5-4 mils dry per coat)

Metal - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Structural Iron, Ferrous Metal)**a. Eg-Shel Finish**

1st Coat: S-W Kem Bond® HS Universal Metal Primer, B50NZ3,
B50WZ4 (8 mils wet, 5 mils dry)

2nd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75

3rd Coat: S-W Tile-Clad® HS Epoxy, B62WZ100 / B60VZ75
(2.5-4 mils dry per coat)

Addendum # 2 also includes the following:

SK-1 – Enlarged plan of A1.1 showing revised counter openings

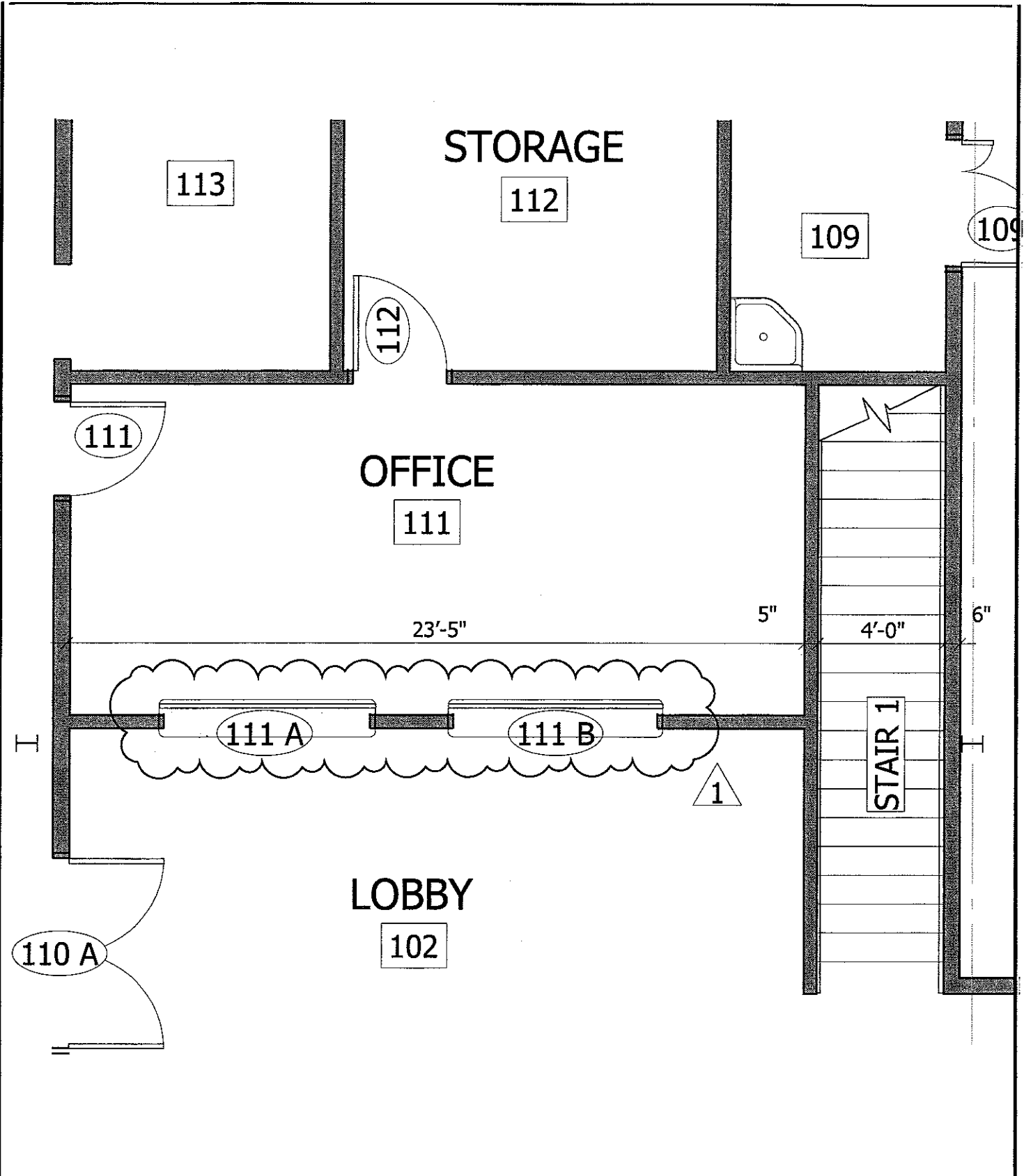
SK-2 – Enlarged elevation of Window “L”

SK-3 – Typical Head and Jamb details for interior wall framing

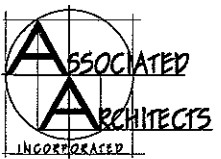
SK-4 – Construction Entrance Detail

Letter from State Fire Marshal’s Office dated October 18, 2007 regarding the review of the plans and construction inspections to E.L. Robinson Engineering.

Summit Electric’s Request for Substitution.



10/31/07 ASSOCIATED ARCHITECTS, INC.

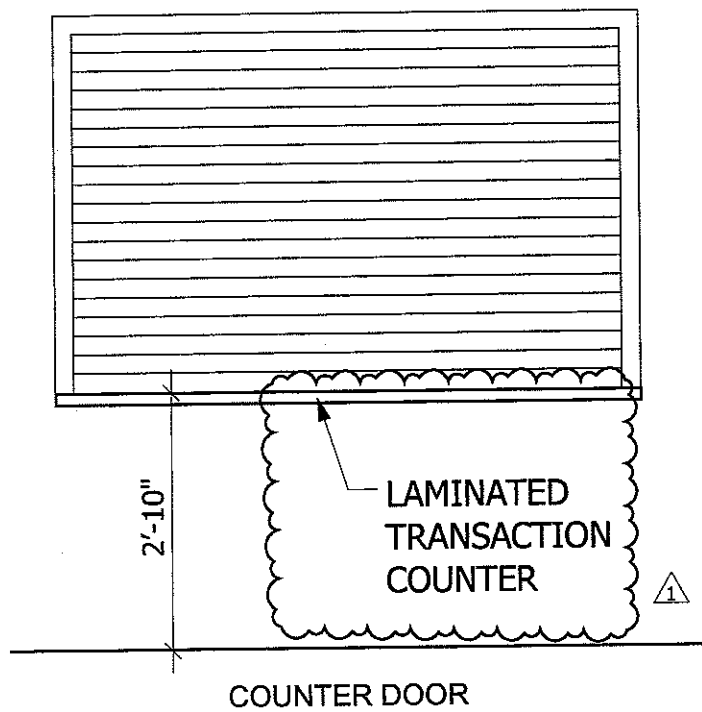


PAUL W. TENNANT AIA
 MARK N. SPENCER AIA NCARB
 318 Lee Street W
 Suite 200
 Charleston, WV 25302
 phone. 304.345.1811
 fax. 304.345.1813

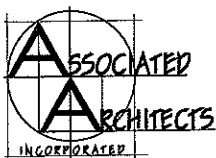
PROPOSED NEW RECREATION CENTER FOR
CHIEF LOGAN LODGE & CONFERENCE CENTER
 LOGAN, WEST VIRGINIA

DATE	10-31-07
DRAWING	SK-1
REFERENCE	A1.1

L



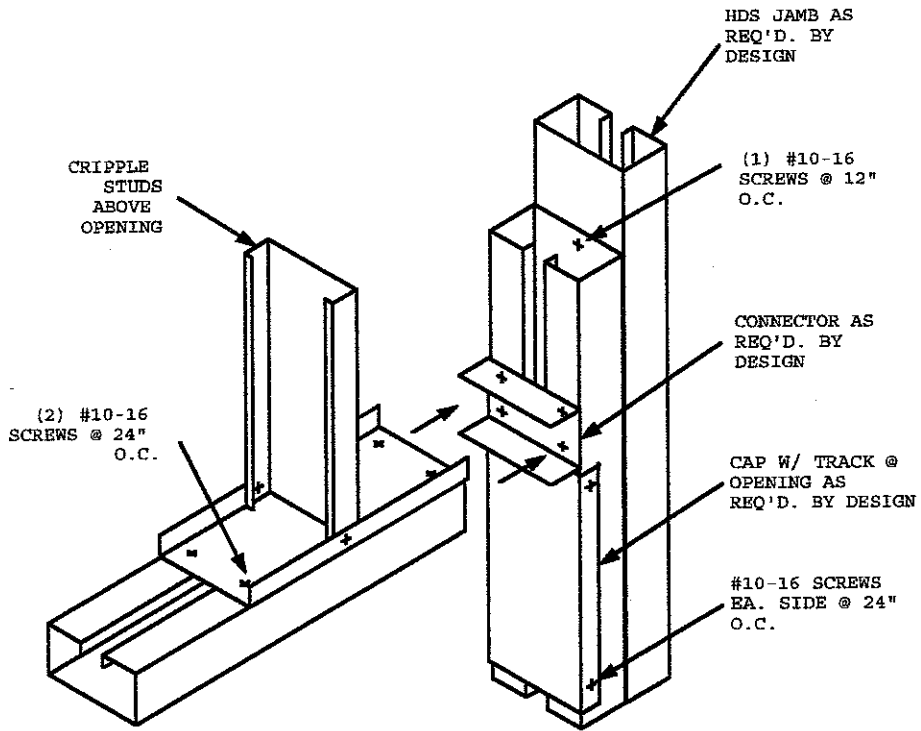
10/31/07 ASSOCIATED ARCHITECTS, INC.



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PROPOSED NEW RECREATION CENTER FOR
CHIEF LOGAN LODGE & CONFERENCE CENTER
 LOGAN, WEST VIRGINIA

DATE **10-31-07**
 DRAWING **SK-2**
 REFERENCE **A1.6**

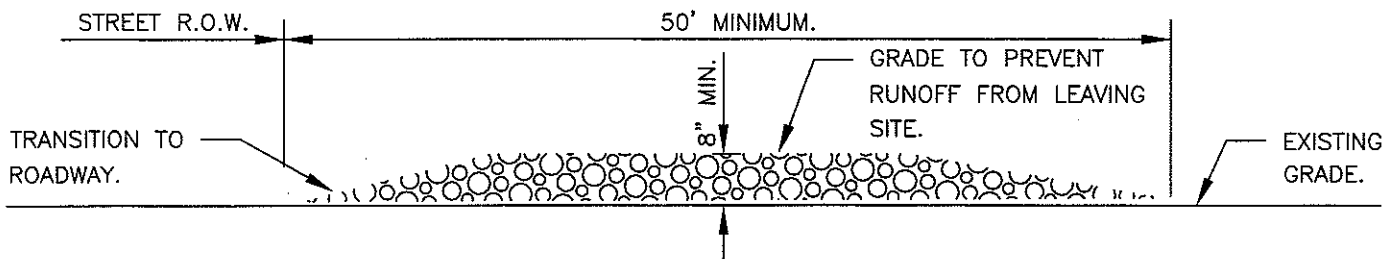


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MULTIPLE HDS JAMB STUDS

PROPOSED NEW RECREATION CENTER FOR
 CHIEF LOGAN LODGE & CONFERENCE CENTER
 LOGAN, WEST VIRGINIA

DATE 10-31-07
 DRAWING SK-3



NOTES:

1. STABILIZED CONSTRUCTION ENTRANCES SHALL BE CONSTRUCTED PRIOR TO GRADING AND CONSTRUCTION ACTIVITY.
2. STONE SIZE SHALL BE 4" – 8" OPEN GRADED ROCK.
3. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 8".
4. LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WIDTH NOT LESS THAN FULL WIDTH OF INGRESS/EGRESS.
5. ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR.

AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.



State of West Virginia
Department of Military Affairs and Public Safety
Joe Manchin III, Governor

Sterling Lewis, Jr.
State Fire Marshal

Phone: (304) 558-2191
Fax: (304) 558-2537

STATE FIRE MARSHAL'S OFFICE
1207 Quarrier St, 2nd Floor
Charleston, WV 25301

October 18, 2007

E. L. Robinson Engineering
5088 Washington St. W.
Cross Lanes, WV 25313

Re: WV DNR Chief Logan Recreation Ctr – Type II 000 Date Received: 10/11/07
Conference Ctr. Dr. Logan/Logan Co. – 1-story Date Reviewed: 10/18/07
ARCH/Assembly (37,050 sq. ft.) (Occ Load 4158) Document No: 2007-6496

Dear E. L. Robinson Engineering,

The plans for the referenced project have been reviewed. This review relates to State Fire Code requirements only. It does not address Building Code or ADA requirements. This review procedure does not relieve the owner, architect or engineer of responsibility.

The above referenced project has been reviewed and the plans, as submitted, appear to meet the West Virginia State Fire Code. The following comments apply:


1. Sprinkler system needs to be added to spec. book.
2. Notify Fire Alarm System Contractor to submit plans to this office for review.
3. Notify Sprinkler System Contractor to submit plans to this office for review.
4. Any construction revisions making changes to exiting, major mechanical and electrical plans prior to and during construction shall be submitted to this office for review.
5. Two weeks prior to completion, please notify the Inspection Division at ext. 214. **All review fees must be paid before final inspection.**
6. The review fee for this project is \$3560.00 and an invoice was sent to Bradley Leslie with WV DNR.

Review fee includes all construction inspections, final inspections, and the occupancy permit.

All electrical work must be done by West Virginia Licensed Electrician's.

Should you have any further questions about this or other projects that would be serviced by this office, contact me at 304-558-2191, ext. 218.

Yours for better fire protection,


Norman R. Fetterman
Plans Examiner

NRF/dh

Cc: File, Inspection, DSFM Carrico, Owner

Chief Logan State Park
Recreational Center

02/07

SECTION 03300-CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The work covered by this Section consists of furnishing all labor, equipment and material required to construct cast-in-place concrete in accordance with lines, elevations, cross-sections, and related work as described herein and/or shown on the Drawings.
- B. The General Conditions, Supplementary Conditions, and all other herein bound and accompanying documents are part of this Section and of the Agreement. Submission of proposal implies that the bidder is fully conversant with requirements of the above-mentioned documents.

1.02 SUBMITTALS

- A. Shop Drawings submittals shall be made in accordance with the provisions of Division 1. Obtain the Engineer's review of this submittal prior to fabrication.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 1. ACI 318 "Building Code Requirements for Reinforced Concrete".
 2. ACI 350 "Concrete Sanitary Engineering Structures".
 3. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
- B. The Contractor shall provide the services of an independent testing laboratory to perform concrete testing, in strict accordance with the following specifications.

<u>TEST</u>	<u>ASTM SPECIFICATIONS</u>
Slump	C 143
Air	C 173
Test Cylinders	C 31 or C 513
Core Sample	C 42

1. Slump shall be measured for each truckload of concrete and each time test cylinders are to be made and at any other time upon request of the Engineer. The slump shall be not more than 4 inches nor less than 2 inches unless specifically expected by the Engineer.
2. Air content shall be measured for each truckload of concrete and each time test cylinders are to be made and at any other time upon request of the Engineer. Air content shall be not less than 4 ½% nor greater than 9 ½%.

3. Test cylinders shall be made in sets of four. One cylinder shall be field cured and broken at 7 days. Three cylinders shall be laboratory cured and broken at 28 days. Contractor shall be responsible for all handling and transportation to an approved testing laboratory. Contractor shall submit to the Engineer three copies of each testing laboratory report.
4. The average strength of Laboratory cured cylinders as well as the average of any 5 consecutive strength tests shall be equal to, or greater than, 3,000 lbs. per sq. in. and no strength test shall have a value less than 2800 lbs. per sq. in. Where the quality of hardened concrete is questionable, the Engineer may require test to be performed in accordance with A.S.T.M. C 42.
5. A set of test cylinders shall be taken for each 50 cubic yards concrete placed or fraction thereof, or at any other time as required by the Engineer.
6. The Contractor shall bear all costs of testing.
7. The Contractor shall submit a letter that material supplied is certified by the West Virginia Division of Highways.

PART 2 – PRODUCTS

2.01 MATERIALS

A. STANDARDS

1. Concrete
 - a. Cement – ASTM C150, Type 1
 - b. Course Aggregate – ASTM C33, No. 57
 - c. Fine Aggregate – ASTM C33
 - d. Water – Approved source, clear and clean
2. Reinforcing
 - a. Bars – ASTM A 615, Grade 60
 - b. Welded wire fabric – ASTM A 185
 - c. Cold drawn wire – ASTM A 82
3. Air-Entraining Admixture – ASTM C260
4. Expansion joints – Pre-molded, ¾” thick

B. PROPORTIONING AND DESIGN OF MIXES

1. Concrete mix design shall conform to the standards set forth in the latest edition of Portland Cement Association’s “Design and Control of Concrete Mixtures”.
2. Concrete shall be subject to the following limitations:

Chief Logan State Park
Recreational Center

02/07

- | | | | |
|----|---------------------------------|--------------|--------|
| a. | Compressive Strength at 28 days | 3,000 psi | - Min. |
| b. | Cement per cubic yard | 6 bags | - Min. |
| c. | Water – Cement Ratio | 5 ½ gal/bag | - Max. |
| d. | Course Aggregate | 1 ½" | - Max. |
| e. | Entrained Air | 4 ½% to 9 ½% | |
3. Site mixed concrete will not be accepted except for fence post installation and thrust blocks.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Site-mixed concrete shall be thoroughly mixed in approved type batch mixer having a capacity of not less than ½ cubic yard. The volume of the mixed batch shall not exceed the manufacturer's rated capacity of the mixer.
- B. The mixing time for each batch, after addition of water to cement and aggregate, shall not be less than 1 ½ minutes for each 1 cubic yard of materials. The mixing drum shall operate at the speed for which it was designed, provided said speed is more than 14 rpm and less than 20 rpm.
- C. All ready-mixed concrete shall be mixed, delivered and placed in accordance with ASTM Specifications C94.
- D. Concrete shall be discharged from the truck within 1 ½ hours after the water has been added to the mix.
- E. The delivery ticket shall contain the cubic yards in the load, the percent of air, the total number of bags of cement in the load and the total gallons of water in the load.
- F. Water may be added at the job site in order to achieve the specified slump on the condition that the water-cement ratio that results upon addition of the water does not exceed the maximum allowable ratio. Upon addition of any water at the job site, there shall be a minimum of 20 revolutions at mixing speed.

3.02 FORMWORK

- A. Standard Practice: Shall conform to these Project Specifications, to Chapter 4 of ACI Standard 301, and to ACI Standard Recommended Practice for Concrete Formwork (ACI-347).
- B. Design: Contractor shall assume full responsibility for the design and construction of all formwork as to safety, strength, allowances for tolerances, maintenance of design shapes, and similar formwork essentials.
- C. Workmanship: Formwork shall be true and rigid, thoroughly braced, both horizontally and diagonally, sufficiently strong to carry dead and live loads to which it may be subjected, sufficiently tight to prevent leakage of mortar, so finish concrete will conform to shapes, lines, grades, dimensions, indicated in plans.

- D. Formwork Approval: Shall be issued by the Engineer, in writing, before any type of prefabricated formwork is installed. Fiberboard, metal or similar type of prefabricated forms will be considered by the Engineer for the forming of columns unless specifically noted below. Forms for columns exposed in the finally finished work, unless specifically noted under "Materials", shall be formed using seamless laminated fiber tubes that conform to size and shape required by the schedules on the Project Drawing.
- E. Materials: Unless specified otherwise, type of forms to be used to produce smooth exposed concrete surfaces substantially free of surface defects is left to the option of the Contractor.
1. Free standing posts for support of slab forms and beams and girder bottoms shall not be smaller than 4" x 4" or steel posts of required capacity.
 2. For exposed walls, see Article F.
- F. Chamfers: Provide 1" chamfers along all exposed concrete edges unless shown otherwise on plans.
- G. Construction: Build forms from pieces as large as practical. Lay out forms to hold straight line joints.
1. Form for footings all sides.
 2. Exposed concrete finish is considered concrete exposed to public view in or outside of completed structure.
 3. On concrete not exposed to view, concealed by dirt backfill, walls, masonry, plaster and materials other than paint or fabrics, Contractor may use optional forms specified hereinbefore.
 4. Where walls will remain exposed, Contractor shall use new plywood, prefabricated metal or wood forms. Boards may not be used. Joint arrangement shall be approved by Engineer.
 5. Provide access openings at base of vertical forms to clean and inspect forms and reinforcing prior to depositing concrete.
- H. Form Ties: Shall be metal, of type that, when forms are removed, ties will break not less than one inch inside finished concrete surface. Wire ties will not be permitted to be used as form ties.
1. Plastic Cone Snap Ties with 1 - 1/2" break back are approved as form ties.
 2. Removal of wall ties shall leave holes clean cut and of practically same size as metal removed and without leaving shallow depressions or disfigurements on face of concrete.
- I. Treat of Wet Contact Forms as follows: Coat plywood, wood moldings, with non-staining form oil or other approved bond breaking agent. Wipe off excess oil with rags. Coat board forms with oil or lacquer in cold weather, in warm weather keep continuously

wet with water at least 12 hours before concrete is poured. Give metal forms coat of light form oil; in hot weather cool by thoroughly wetting with water just prior to placing concrete. Use no oil or other bond breaking agent where concrete is to receive plastic finish plaster, ceramic tile or acoustical units unless agent is manufactured for that purpose. Apply oil, lacquer or agent before reinforcement is placed. Oil, lacquer or agent on reinforcement will not be permitted. Form oil shall be water repellent form oil.

- J. Repairing and Cleaning: Thoroughly clean, patch and repair form material before reusing. Repair any damage to forms, patch holes and defects.
- K. Chases, Slots and Recesses: Construct as indicated and reasonably implied by the plans, except where formed by sleeves, frames, boxes of other equipment furnished by other trades. Consult trades requiring chases, slots and recesses for definite locations, shapes and dimensions.
- L. Tolerance: Alignment of formwork shall be as required to maintain during and after placing of concrete those permissible tolerance limits set forth in ACI 347.

3.03 PLACING CONCRETE

- A. Except as modified herein the ACI-614 Recommended Practice for Measuring, Mixing and Placing of Concrete as apply to Placing – Chapter IV, shall constitute the requirements of this specification.
- B. No horizontal joints will be permitted in concrete below grade except as shown on structural drawings. Vertical lifts shall be no greater than 12 inches.
- C. Concrete shall not be spouted, or delivered by spout or trough from hoist, nor dumped into carts or on decks with free fall of more than 3' – 0". Spreading of concrete by means of hoes and shovels will not be permitted for distance greater than 3' – 0" from delivery end of chutes, carts or buggies. If pumping is to be used, submit method for approval. Use of aluminum piping for delivery system is prohibited.
- D. Concrete shall be placed with the aid of internal mechanical vibrator equipment capable of 7,000 impulses per minute. Vibration shall be transmitted directly to the concrete. The duration of vibration at any location shall be held to a minimum necessary to produce thorough compaction and also to cause maximum amount of air bubbles to migrate to the top of the placement. Be sure to vibrate around all waterstops.
- E. When placing of concrete is suspended, necessary groves for jointing future work must be made before concrete has begun to set, but in all cases such jointing shall occur at sections of minimum shear.
- F. When work is resumed, contact face of concrete previously placed shall be roughened, thoroughly cleaned of foreign matter, and slushed with mortar consisting of one part cement and one part clean sharp sand.
- G. Top surfaces shall be smooth and uniform as possible. Test frequently with 10' – 0" straight edge during finishing operations and correct deviations in excess of 1/8" within length of straight edge. Finish slab surfaces as hereinafter specified. If finish is not at this level, where resilient flooring occurs, this Contractor shall provide latex of other

approved fill. Underlayment or fill must be approved by tradesman installing under his direction.

3.04 EMBEDDED ITEMS

- A. In all concrete slabs, except slabs on grade, where pipes and conduits are permitted and are not otherwise provided for, the following restrictions must be adhered to.
- B. No duct, conduit, pipe or fitting shall be larger in cross sections than 4% or any columns into which it is placed.
- C. Ducts, conduits, pipe and their fittings when placed in any slab shall be no larger than 1/3 the thickness of the slab nor placed closer than 3" O.D. from each other.
- D. All reinforcing steel must be in place before any other embedment is placed and no reinforcing shall be cut or moved without the permission of the Engineer.
- E. Sleeves larger than 2" I.D. and closer than 3" O.D. of material thinner than standard pipe passing through beams or slabs must have the approval of the Engineer.
- F. Slabs on grade shall not be used to contain ducts, conduits and pipes. All such work shall be placed under the slab deep enough to allow dressing the finished grade for the slab.

3.05 TEMPERATURE FOR CONCRETE WORK

- A. Generally methods for hot weather concreting and cold weather concreting shall conform to ASI "Standard Recommended Practice for Hot Weather Concreting" (ACI 605-59) and "Standard Recommended Practice for Winter Concreting" (ACI 306-66) and amendments thereto as specified in this Specification.
- B. The use of calcium chloride in concrete is prohibited, ASI 306-66 to the contrary notwithstanding.

C. Cold Weather Concreting

1. When air temperatures at the site of work fall below 40 degrees F., or is expected to fall below 40 degrees F. within the ensuing 24 hours, the mixing water and aggregates shall be heated prior to placing in the mixer so that temperature of mixed concrete shall not be less than 70 degrees F. nor more than 90 degrees F.
2. Temperature of concrete at time of placing in the work shall comply with the requirements of applicable tables and schedules in ACI Standard 306-66.
3. Aggregate shall be heated by steam or dry heat using a heating apparatus of such type that it will heat the mass uniformly and to preclude overheated areas or hot spots. Flame throwers or other similar open, direct heating devices in the mixer will not be permitted.
4. During cold weather, maintain aggregates, forms and reinforcing steel free from ice, snow and frozen clay, and protect area where concrete is being placed from weather during and after placing of concrete. Use only approved methods in heating materials, forms, and surrounding air to protect the concrete from frost damage.
5. During cold weather (40 degrees or less) after the concrete is placed in the work it shall be protected on all exposed sides with straw, tarpaulins or other means approved by the Engineer. Adequate means shall be provided for maintaining the surrounding air temperature above 50 degrees F. and not above 75 degrees F. for the duration of the curing period. Methods of heating materials, air and concrete shall be approved by the Engineer prior to placing of concrete. Cooling of the concrete to the outside air, after the curing period is completed, shall be at a rate not faster than one degree per hour for the first day and two degrees per hour thereafter. Any concrete injured or destroyed by reason of freezing or from cold weather shall be replaced by the Contractor at his own expense. This replacement cost shall include the cost of replacing any work embedded in the concrete.
6. Methods of protection and curing shall be such as to prevent evaporation of moisture from surface of concrete for period of not less than 5 days.
7. When concreting any section of building, cover, house or enclose the section in manner that will insure maintenance of specified temperature at the concrete. Leave housing in place for curing period specified, except that when temperature of air is above 35 degrees F. sections may be temporarily removed as required to accommodate placing of forms or concrete, provided that they are replaced immediately after form or concrete is in final position.
8. No antifreeze solutions will be permitted to be added to the concrete to lower the freezing temperature.
9. Within enclosure provide such means of artificial heat that will maintain temperatures in all parts of enclosure. Provide adequate fire protection when heating is in progress and maintain attendants, to keep heating units in

continuous operation. Do not place heating appliances in such a manner as to endanger formwork or centering or exposed area of concrete to drying out or other injury due to excessive temperature. Use caution in venting.

10. Before placing concrete in forms or on surface or around reinforcement, apply heat in such manner that ice or snow will be completely removed. Spreading of salt or chemicals on forms to remove ice or snow will not be permitted. Temperature of forms and reinforcing steel shall be above 32 degrees F.
11. Contractor will be held responsible for danger to workmen and carbonation of concrete resulting from use of heating devices which exhaust CO2 flue gasses directly into room.

D. Hot Weather Concreting:

1. In extremely hot weather, and with use of relatively hot materials, temperature of concrete may be in excess of the safe range. In no case will the use of concrete having a temperature in excess of 90 degrees F. be permitted for use in the work. Cooling of water and aggregates will be required when concrete temperatures rise above this limit.
2. Concrete placed during hot weather shall be protected from drying out during the curing period and shall be protected by adequate covering and moisture control. Handling and protection after placing of concrete shall generally comply with ACI Standard 605-59. The addition of accelerating type admix agent to the concrete is not permitted.

3.06 REMOVAL OF FORMS

- A. Forms shall not be disturbed until concrete has adequately hardened. Shoring shall not be removed until member supported has acquired sufficient strength to support safely its own weight and other loads to be imposed on member. Length of time that forms and centering shall remain in place will be dependent upon the temperatures and curing conditions to which freshly placed concrete has been subjected.
- B. Tie-rod clamps that are to be removed entirely from wall shall be loosened 24 hours after concrete is placed and form-ties may be removed at that time, except for sufficient number to hold forms in place.
- C. The following table shall be considered minimum waiting period after placing concrete before forms may be stripped:

Structural Members	Waiting Period
Column, wall, beam sides	3 days
Spans less than 12-0; slab, beam bottoms	7 days
Spans greater than 12-0; slab, beam bottoms	10 days

1. The above table shall apply to curing mean temperature above 50 degrees F.; for lower mean temperatures, waiting time shall be increased 50%; in addition to above requirement concrete shall have acquired 80% of its specified cylinder strength.
- D. All slabs, beams, must be reshored until concrete reaches age of 28 days.

3.07 PATCHING AND FINISHING

- A. There should be little need for patching concrete if formwork is proper and concrete is placed and compacted properly. Patching and rubbing of faulty work shall be done as specified hereinafter.
- B. After removal of forms, remove all concrete that obviously has been improperly formed, or is out of alignment or level beyond tolerances, or which shows a defective surface which cannot be repaired or patched to the satisfaction of the Engineer. Patch all tie holes and all repairable defective areas immediately after forms have been removed. Correct all repairable surface defects in the following manner.
 1. Fill honeycombed surfaces, stone pockets and irregularities with cement mortar 1:2 mix, cement, sand.
- C. Other than areas to be sandblasted, rub exterior exposed finish concrete with carborundum stone to provide uniform smooth trowel like appearance.
- D. All shrinkage and structural cracks in the concrete work which, in the opinion of the Engineer, are likely to permit water to seep through, shall be sealed with a suitable compound manufactured for that purpose. The compound shall be applied in strict accordance with the manufacturer's recommendations. Use a clear tape to contain the sealer in vertical joints and observe the effectiveness of the application.
- E. No additional compensation will be made for taping sealing shrinkage cracks. The Contractor shall include in his bid price an amount adequate to compensate for this sealing.
- F. Remove all honeycombed and other defective concrete, but in no case to a depth of less than one inch. Dampen area to be patched and an area at least six inches wide surrounding it to prevent absorption of water from patching mortar. A bond of neat Portland cement and water, and if permitted by the Engineer, some fine sand passing a No. 30 mesh sieve, shall be mixed to consistency of thick cream and be well brushed into the surface to be patched.
- G. Make patching mixture of same material and of approximately same proportions as used for concrete, except that coarse aggregate shall be omitted and mortar shall consist of not less than 1 part cement to 2 ½ parts sand by damp, loose volume. Substitute white Portland cement for part of grey Portland cement on exposed concrete finish in order to produce color matching that of surrounding concrete, as pre-determined by trial patch.
- H. Quantity of mixing mortar shall be not more than necessary for handling and placing. Mix patching mortar in advance and allow to stand with frequent manipulation with addition of water, until it has reached stiffest consistency which will permit placing.

- I. After surface water has evaporated from area to be patched, thoroughly brush bond coat into surface. When bond coat begins to lose water sheen, apply pre-mixed patching mortar. Thoroughly consolidate mortar into place, and strike off so as to leave patch undisturbed for a minimum of one (1) hour before final finishing. Keep patched area damp for seven (7) days. Do not use metal tools in finishing a patch in a formed surface which will be finally exposed in the completed work.
- J. After being cleaned and thoroughly dampened, tie holes shall be filled solid with patching mortar.
- K. Final "working-out" of patched surfaces shall be executed to match adjacent non-patched surfaces within a reasonable degree of appearance and acceptable to the Engineer.

3.08 PROTECTION AND CURING

- A. Protect concrete from frost and rapid drying and keep moist for at least 7 days after placing. This shall be accomplished by covering in moistened condition. Ceilings, walls and beam sides may be cured by leaving forms in place. Forms removed in less than 5 days and cement finishes shall be sprayed during curing period as frequently as drying conditions may require to keep surfaces moist and if necessary protected by suitable temporary coverings. Moisture curing is not waived by reason of work being enclosed in artificially heated area.
- B. Floors: After troweling has been completed and concrete has hardened sufficiently, cure and protect all floors by covering with non-tearing waterproof paper, mats or continuous waterproof covering. Covering shall be of type that will not stain or discolor finished concrete surfaces.
- C. In lieu of above, Engineer will accept spraying of concrete surfaces with liquid curing compound. Curing compound shall be supplied by Huntington Laboratories, Concrete Seal, Tock Bros., Inc., Toxkure, Sonneborn Building Products, Inc.'s Kure-N-Seal, Grace Co.'s Clear Seal or equal conforming to Fed. Spec. C309. Concrete sealers not acceptable. No curing compound may be used where hardener or sealer is required or where epoxy or urethane finishes are called for.
 - 1. Compounds shall be guaranteed by manufacturer that they will not affect adhesive quality of adhesives used for applying carpet, resilient and ceramic tile to concrete or affect paint coatings.
 - 2. Areas subject to direct sunlight shall be covered with white pigment compound; all others may be covered with fugitive dye compound.
- D. During time cement work is being installed, protect all finished work of other trades with non-staining, heavy building paper or other material required by character of work. Install in a manner to prevent damage, staining or marring of stone, tile, flooring, base, plaster, painter's finishes or other adjoining finished work.
- E. Protection to remain in place until installation of permanent floor covering, until completion of work or until removal is directed.

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- F. During warm or windy weather extreme caution shall be taken to prevent rapid drying by spraying surface lightly with water.

3.09 CONSTRUCTION JOINTS

- A. Joints not shown on the Plans shall be made and located in accordance with methods which will least impair strength of the structure. All joint locations shall be planned far enough in advance of placing operations to permit the Engineer's structural analysis thereof. No joint shall be made until approval by the Engineer is granted. At least forty-eight (48) hours shall elapse between the placing of adjacent units.
- B. All reinforcing steel bars or welded wire mesh shall be continuous across construction joints. Provide keys and inclined dowels, as indicated on the Plans or as directed by the Engineer.
- C. Provide longitudinal 1 ½ inch minimum depth keys in all construction joints in walls and wall footing unless noted otherwise.
- D. For construction joints where left-in-place screed key form is not provided and before new concrete is deposited against the previously placed concrete, thoroughly clean the previously placed concrete surface with an approved type of polysulfide epoxy bonding agent throughout joint area.
- E. In all water retaining structures, spacing between construction joints and/or formed crack control joints shall not exceed a vertical distance of 15 feet or a horizontal distance of 30 feet.
- F. Construction joints shall be prepared and bonded as provided in Section 601 of ACI 301-66.

END OF SECTION 03300

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SECTION 07430 - METAL ROOF AND WALL PANELS

These panels are to be used on the Pool Side of the Building.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Insulated metal wall panels.
- B. Insulated metal partition panels.
- C. Insulated metal roof panels.
- D. Flashing and trim integral to insulated panels.
- E. Clips, anchoring devices, fasteners, and accessories for installation of panel system.

1.2 RELATED SECTIONS

- A. Section 07620 - Sheet Metal Flashing and Trim.
- B. Section 07900 - Joint Sealers

1.3 REFERENCES

- A. AAMA 501.1 - Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure.
- B. AAMA 1503.1 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- C. ANSI/FM Approvals 4880 - Evaluating Insulated Wall or Wall and Roof/Ceiling Assemblies, Plastic Interior Finish Materials, Plastic Exterior Building Panels, Wall/Ceiling Coating Systems, and Interior or Exterior Finish Systems.
- D. ASTM A 653/A 653M-01a - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- F. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- G. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

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- H. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- I. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- J. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C (1382 degrees F).
- K. ASTM E 283 - Standard Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- L. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- M. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- N. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel System.
- O. CAN 4-S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- P. CAN/ULC S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- Q. CAN/ULC S126 - Standard Method of Test for Fire Spread Under Roof-Deck Assembly.
- R. CAN/ULC S127 - Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Material type, metal thickness and finish.
 - 4. Installation methods.
- C. Shop Drawings: Including elevations, fastening patterns, sections of each condition and details as required.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

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- F. Panel Sample: Submit 1 foot (305 mm) high by full width sample panel for each profile specified indicating the metal, texture and finish.
- G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing factory foamed in place insulated metal panels with a minimum documented experience of ten years.
- B. Installer Qualifications: Company specializing in installation of the products specified for projects of similar size and scope with minimum five years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products off the ground, with panels sloped for drainage and covered to protect factory finishes from damage.
- C. Do not overload roof structure with stored materials. Do not permit material storage or traffic on completed roof surfaces.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's two year limited warranty that panels are free from defects in materials and workmanship, beginning from the date of shipment of panels, but excluding coil coatings (paint finishes) covered under a separate warranty. Warranty does not include interior painted surface of panels.
- B. Submit manufacturer's written five year limited warranty providing panels to be free from gas blister formation of the foam core to the exterior panel facing, beginning from the date of shipment of panels.
- C. Submit exterior paint manufacturer's written 10 year limited warranty on paint finish against cracking, peeling, blistering, chalk and color change.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Metl-Span I, Ltd., which is located at: 1497 N. Kealy ; Lewisville, TX 75057; Toll Free Tel: 877-585-9969; Tel: 972-221-6656; Fax: 972-420-9382; Email: sdanfor@metlspan.com; Web: www.metlspan.com or equal.
- B. Substitutions: Approved Equal.

- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MATERIALS

- A. Panel - General Requirements: Roll-formed exterior and interior steel sheet faces chemically bonded to continuously foamed-in-place polyurethane core; laminated panels are not acceptable; Metl-Span III.
1. Exterior and Interior Faces: ASTM A 653/A 653M, minimum Grade 33, stucco embossed, G90 galvanized steel, unless otherwise indicated.
 2. Interior Face Profile: Lightly corrugated, stucco embossed; "Mesa", unless otherwise indicated.
 3. Longitudinal Joint Sealants: Field applied.
 4. Foam Core: Non-CFC, Class I, polyurethane.
 5. Exterior Finish: One coat 70 percent polyvinylidene fluoride, nominal 0.7 mil (0.02 mm) thick, over 0.2 mil (0.005 mm) primer; color as selected by Architect from manufacturer's standard colors.
 6. Exterior Finish: One coat siliconized polyester, nominal 0.7 mil (0.02 mm) thick, over 0.2 mil (0.005 mm) thick primer; color as selected by Architect from manufacturer's standard colors.
 7. Interior Finish: One coat, factory applied coil coating in standard Igloo White, nominal 0.7 mil (0.02 mm) thick, over 0.2 mil (0.005 mm) primer; color USDA compliant.
- B. Metl-Span III Wall Panel System Requirements: Provide panel system with the following characteristics in addition to those specified:
1. Structural Performance: Capable of withstanding positive 20 psf (0.96 kPa) wind load when tested in accordance with ASTM E 72 Air Bag Method, without damage and without deflection exceeding L/180 for exterior walls, L/120 for interior walls and L/240 for ceiling panels.
 2. Air Infiltration: Not more than 0.06 cfm (0.33 meters cubed/second) per square foot of wall area when tested in accordance ASTM E 283 at static pressure of 12.0 psf (0.576 kPa).
 3. Static Water Penetration: No uncontrolled water penetration through panel joints at static pressure of 20.0 psf (0.96 kPa) when tested in accordance with ASTM E 331.
 4. Dynamic Water Penetration: No uncontrolled water penetration through panel joints when subjected to 95 mph (153 kph) slipstream airflow and application of water for 15 minute period in accordance with AAMA 501.1.
 5. Condensation Resistance Factor: 92, minimum, when tested in accordance with AAMA 1503.1.
 6. Fire Performance: FMRC Approvals 4880 Class I approved with no height restrictions.
 7. Thermal Transmission (K-factor): .127 btu/sf/hr/deg F at a 75 degrees F (24 degrees C) mean temperature when tested in accordance ASTM C 518.
 8. Fatigue Resistance: Capable of withstanding deflection cycling at L/180 to 2 million alternate cycles with no evidence of delamination, core cracking or permanent bowing.
 9. Freeze/Heat Resistance: No delamination, surface blistering or permanent bowing when subjected to cyclic temperature extremes of minus 20 degrees F (28 degrees C) to plus 180 degrees F (82 degrees C) for 21 eight-hour cycles.

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10. Humidity Resistance: No delamination or metal corrosion at interface when subjected to 140 degrees F (60 degrees C) temperature and 100 percent relative humidity for total of 1200 hours.
 11. Autoclave Test: No delamination of the core from metal skins when exposed to 2 psi (0.122 kg/sq cm) pressure at temperature of 212 degrees F (100 degrees C) for total of 2-1/2 hours.
- C. Architectural Wall Panels: Metl-Span III CF-36A; concealed fastener wall panels with offset double tongue and groove joinery and an extended metal shelf allowing fasteners to penetrate both metal faces with clips concealed in the side joint.
1. Face Profile: Flat, stucco embossed.
 2. Module Width: 36 inches (91.44 cm) (CF-36A).
 3. Exterior Face: 24 gauge, 0.0250 inch (0.635 mm).
 4. Interior Face: 26 gauge, 0.0187 inch (0.475 mm).
 5. Thickness: 2-1/2 inches (6.35 cm).
- D. Partition Panels: Metl-Span III CF-45; concealed fastener wall panels, with offset double tongue and groove side joints, attached with through fasteners or with back fasteners.
1. Face Profile: 1/8 inch (3.175 mm) deep corrugations; "Mesa".
 2. Module Width: 44-1/2 inches (113.03 cm).
 3. Exterior Face: 26 gauge, 0.0187 inch (0.475 mm).
 4. Interior Face: 26 gauge, 0.0187 inch (0.475 mm).
 5. Thickness: 2-1/2 inches (6.35 cm).
- E. Roof Panels: Metl-Span III CFR-42 high mechanically closed standing seam on exterior face, tongue and groove interlock on interior, and ends factory notched and swaged to form lap joints; attached to structure with clips and fasteners concealed in side joint; no exposed fasteners visible from exterior, no through fasteners into ribs or flat areas of panel.
1. Face Profile: Stucco embossed with 1/8 inch (3.175 mm) deep corrugations between ribs; "Mesa".
 2. Module Width: 42 inches (106.68 cm) (CFR42).
 3. Exterior Face Material: ASTM A 653, /A 653M with stucco embossed texture, G90 galvanized steel.
 4. Exterior Face: 24 gauge, 0.0250 inch (0.635 mm).
 5. Interior Face: 26 gauge, 0.0187 inch (0.475 mm).
 6. Thickness: 3 inches (7.62 cm).
- F. Flashing and Trim: Brake-formed sheet metal in the same thickness and finish to match the panels.
- G. Trim: Extruded aluminum finished to match panels.
- H. Fasteners: Clips, anchoring devices, fasteners, and accessories for installation of panel system as recommended by panel manufacturer for the system specified.
- I. Sealant: Sealant as recommended by panel manufacturer.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine structural members before beginning installation to ensure that all supporting members are straight, level, plumb and satisfactory for panel installation.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- C. Correct defective conditions before beginning work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and recommendations including approved shop drawings, installation guidebook and manufacturer's handbook of construction details.
- B. Form panel shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.
- C. Install flashing and trim true and in proper alignment.
- D. Install sealants where indicated to clean dry surfaces only without skips or voids, to ensure weather tightness and integrity of the vapor barrier.

3.3 CLEANING

- A. Replace damaged panels and other components of work, which cannot be repaired by finish touch-up or similar minor repair.
- B. Wipe finished surfaces clean of any filings caused by drilling or cutting to prevent rust staining.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07430

SECTION 13122 – METAL BUILDING SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies a rigid-frame-type metal building system as detailed and dimensioned on the plans.

1.2 RELATED SECTIONS

- A. Drawings and other specification sections may apply to this section.

1.3 REFERENCES

- A. American Institute of Steel Construction (AISC): "Manual of Steel Construction."
- B. American Iron and Steel Institute (AISI): "Cold-Formed Steel Design Manual," 1986 edition.
- C. American Society for Testing and Materials (ASTM):
 - 1. A36-88 Structural Steel.
 - 2. A446-87 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dipped Process, Structural Quality
 - 3. A463-88 Steel Sheet, Cold Rolled, Aluminum Coated Type 2.
 - 4. A792-86 Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 5. A570-88 Steel, Sheet and Strip, Hot Rolled, Structural Quality.
 - 6. A572-88 High Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.
 - 7. A307-88 Carbon Steel Bolts.
 - 8. A325-88 High Strength Bolts for Structural Joints.
- D. Underwriters Laboratories (UL): "Tests for Wind-Uplift Resistance pf Roof Assemblies - UL 580."
- E. American Welding Society (AWS): "Structural Welding Code - Steel," ANSI/AWS D1.1-90.
- F. Metal Building Manufacturers Association (MBMA): "Low Rise Building Systems Manual."

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's specifications and technical literature.

1.5 QUALITY ASSURANCE

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- A. The Metal Building System shall be designed, engineered and fabricated by a Building Manufacturer who has been regularly engaged for at least twenty (20) years in the design, engineering and fabrication of the type and quality herein specified.
- B. Unless otherwise noted, all materials in this specification shall be furnished by the Building Manufacturer.
- C. The Building Manufacturer shall be certified for AISC's QUALITY CERTIFICATION, CATEGORY MB program. This project shall be engineered and fabricated to meet the requirements of this certification.
- D. All structural mill sections and welded plate sections shall be designed in accordance with the AISC's "Manual of Steel Construction."
- E. All cold-formed steel structural members shall be designed in accordance with the 1986 edition AISI's "Cold-formed Steel Design Manual."
- F. All roof and wall panels shall be designed in accordance with the AISI's "Cold-formed Steel Design Manual."
- G. Welded connections shall comply with the American Welding Society's (AWS) "Standard Code for Arc and Gas Welding in Building Construction" for welding procedures. All materials shall be new and unused prior to fabrication. The Building Manufacturer shall warrant the materials manufactured by it, if properly erected in accordance with the plans, specifications and erection manual furnished by it, against defects in materials and workmanship for a period of one (1) year after delivery.

1.6 JOB SITE RECEIVING, STORAGE, AND HANDLING OF MATERIALS

- A. All materials shall be unloaded, handled, hauled and delivered to storage by competent workmen in a manner which will prevent bends, dents, scratches or other damage. Damaged materials shall be rejected and promptly replaced. All materials shall be properly stored and protected from weather damage. All shipments must be thoroughly checked by the consignee. If shortage or damage is found, a notation must be placed on the bill of lading and must be confirmed by the carrier.
- B. Primed Materials: Upon receipt, all bundles of primed material shall be stored on blocking at an angle sufficient to allow any trapped water to drain and should be protected from the weather by covers allowing air circulation. Water, ice and snow should not be allowed to collect and remain thereon.
- C. Roof & Wall Panels: Bundles of panels shall be inspected for moisture upon receipt. If moisture is present, dry the panels and, if possible, store them in a warm, dry place. The panel bundles shall be elevated and sloped in a manner to allow moisture to drain. Cover all bundles with a tarp or plastic, leaving air spaces for adequate air circulation.
- D. Skylights: Upon receipt, bundles of skylights shall be inspected for moisture. If moisture is present, dry the panels and store them in a shaded, dry place. The panel bundles shall be elevated and sloped in a manner to allow moisture to drain. Cover all bundles with a tarp or plastic, leaving air spaces for adequate air circulation.

1.7 ERECTION

- A. The erection of the metal building and the installation of accessories shall be performed in accordance with the Building Manufacturer's erection drawings and erection manuals by a qualified erector using proper tools, equipment and safety practices.
- B. Erection practices shall conform to Section 6, Common Industry Practices found in the "Low Rise Building Systems Manual," MBMA 1986.
- C. There shall be no field modifications to primary structural members except as authorized and specified by the Building Manufacturer.

PART 2 - DESIGN CRITERIA & LOADS

2.1 IBC International Building Code 2003

2.2 Design Criteria - All code references are to the IBC International Building Code 2003.

2.3 Combinations of loads shall be in compliance with IBC Building Code.

2.4 Roof Loads shall be applied in compliance IBC Building Code.

Dead Load - Weight of all building components finished by the metal building system Manufacturer.

Roof Snow Load shall be determined using site specific values based on the following

Ground Snow Load, $P_g = 30$ psf

Classification of Building (Importance Factor) II, $I_s = 1.2$

Terrain Category C: Partially Exposed, $C_e = 1.0$

Thermal Factor: (Building kept just above freezing), $C_t = 1.1$

2.5 Load Combinations and reduction factors to be performed in accordance with IBC Code. Note: The wind speed listed in the IBC Code for this site is 90 mph for 3 second gust.

2.6 Seismic Forces shall be determined and applied in compliance with IBC Code. Seismic Zone using site specific values as determined from the code.

PART 3 - Primary & Secondary Framing - Building Structures

3.1 Primary & secondary framing consisting of beams, columns, purlins, girts, eave struts, other structural members and clips shall be factory punched for easy and rapid erection by field bolting, except where shop connections are used. Field welding will not be permitted unless specified by the Building Manufacturer and allowed by the Architect of Record or the Engineer of Record.

3.2 Rigid Frames:

Rigid Frames shall be complete with base plates and splice plates prepared for field-bolted connections. They shall consist of built-up sidewall columns of tapered or constant web depths (see drawings for allowable shape) and rafters with tapered or constant web depths as required by

the Building Manufacturer's design. Interior columns may be pipe sections and located where shown on the drawings.

The rigid frames shall be designed as pinned base, with no moment transferred to the foundation, unless specified otherwise. Steel for all built-up sections shall meet as applicable the physical and chemical properties of:

1. ASTM A 572 modified to 55,000 psi minimum yield and 70,000 psi minimum tensile strength, or ASTM A 607, Grade 55, or ASTM A 570, Grade 55 or
2. ASTM A 572, Grade 50 or ASTM A 607, Grade 50 or ASTM A 570, Grade 50.

3.3 Hot-rolled structural shapes shall comply with the requirements of ASTM A36. Pipes shall comply with the requirements of ASTM A500, ASTM A501, or ASTM A53.

3.4 Endwall Framing:

Endwall columns and beams shall consist of cold-formed "C" sections, hot-rolled sections or built-up sections meeting their respective material specifications.

3.5 Secondary Framing Steel:

Steel used to form the "Z" and "C" shaped purlins, girts and eave struts shall be at least 8" deep and not less than 16 gauge, 55,000 psi minimum yield steel comparable to or exceeding the requirements of ASTM A570-88.

When designed as continuous beams, the purlins and girts shall be checked for the combined bending and shear stresses at the frame centerline and at the end of their laps.

3.6 Bracing:

Bracing to be located as shown on the drawings to remove horizontal wind and seismic forces. The bracing may be either:

1. Cables of ASTM A475, 7 strand, Extra-High-Strength material, 1/4" diameter minimum.
2. ASTM A36 rods, 3/4" diameter minimum.
3. ASTM A36 angle, pipe or tube.

If x-bracing cannot be used, portal frames or fixed-base endwall columns may be used.

3.7 Structural Painting:

All structural steel and light gauge steel members shall be cleaned of loose mill scale, dirt and other foreign material by the procedures of SSPC-SP2 and then be given a one mil coat of red oxide primer meeting or exceeding the performance requirements of Specification SSPC 15-68T (replaces and is equivalent to Federal Specification TT-P-636D). The primer is not intended to be a finish coat.

Abrasions caused by handling and erection shall be touched-up by the contractor performing field touch-up. Use the same primer used by the Building Manufacturer.

3.8 Structural Bolts:

All field connections shall be made with black, unpainted ASTM A325 or A307 bolts, nuts and washers as shown on the Building Manufacturer's erection drawings. All bolts shall be installed and tightened in accordance with the "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

- 3.9 Anchor Bolts and Foundation Design:
Anchor bolts shall be ASTM A307 and installed in accordance with the Anchor Bolt Plan furnished by the Building Manufacturer (Anchor Bolts not furnished by Building Manufacturer).
- 3.10 The foundation shall be designed by a Registered Professional Engineer experienced in projects of this complexity.

PART 4 - ROOF PANELS & FINISH

- 4.1 All roof panels covering the Tennis Court Side of the building shall be 24 Gage Long Span.

All roof panels covering the Pool Side of the building will be Metl-span CFR-42 with 3" thickness. Specifications for these roof panels is included in section 07430.

Roof Panel Description

Roof panels shall be manufactured from 24 gage steel and shall have major ribs 12" on center and 1-3/16" high. In the flat area between the major ribs shall be two smaller ribs. Each panel shall provide 36" net coverage in width, side laps of at least one major rib and a purlin-bearing leg.

- 4.2 Fastening & Attachment
All panels shall be attached to the secondary framing members by means of self-drilling, stainless steel capped, No. 12 x 1 1/4" screws assembled with 9/16" OD aluminum and bonded EPDM washer. The fasteners shall be suitable for use with fiberglass blanket insulation from 0" to 4" thick. All panel sidelaps shall be stitched by means of stainless steel capped stitch screws assembled with 9/16" OD aluminum and bonded EPDM washer.
- 4.3 Panel Length and Endlaps
All roof panels shall be continuous from eave to ridge except where lengths become prohibitive for handling purposes. All end laps shall be at least 3."
- 4.4 Closure Strips
The corrugations of the roof panels shall be filled with a pre-formed closed cell non-shrinking, laminated polyethylene closures along the eaves, ridge, and rake when required for weather-tightness.
- 4.5 Sealants
The roof side-laps and end-laps shall be sealed with a 1/2" x 1/8" tape mastic. The material shall be a butyl base elastic compound with a minimum solid content of 99%, SikaTape TC95 or equal. The sealer shall have good adhesion to metal and be non-staining, non-corrosive, non-shrinking, non-oxidizing, non-toxic, and non-volatile. The service temperature shall be from (-60) degrees F to (+212) degrees F. The material shall meet or surpass the requirements of Federal Specification TT-C-1796A Type II, Class B and NAAMM SS-1C-68.
- AZ55 Aluminum-zinc Alloy Coated Panels (Galvalume)
- 4.6 Panel Finish
Panel material shall be aluminum-zinc alloy-coated steel, AZ 55 designation, conforming to the requirements of ASTM A792.
- 4.7 Finish Warranty

Aluminum-zinc alloy-coated panels shall be free of manufacturing defects and shall be warranted against perforation due to corrosion caused by normal atmospheric exposure, rupture or structural failure for a period of twenty (20) years from the effective date. The contractor shall submit 2 sample copies of the warranty with its terms and conditions clearly stated.

PART 5 - WALLS PANELS & FINISH

5.1 All wall panels covering the Tennis Court Side of the building shall be 26 Gage Long Span

All wall panels covering the Pool Side of the building will be Metl-span Mesa with 2.5" thickness. Specifications for these wall panels are included in section 07430.

Wall Panel Description

Wall panels shall have major ribs 12" on center and 1-3/16" high. In the flat area between the major ribs shall be two smaller ribs. Each panel shall provide 36" net coverage in width and side laps of at least one major rib.

Panel material shall be 26 gauge and have a minimum yield stress of 80,000 psi (Grade E).

5.2 Fastening & Attachment

Wall panels shall be attached to the secondary framing members by self-drilling carbon steel screws, No. 12-14x1-1/4" 3 hex washer head, cadmium or zinc plated, assembled with a .040" minimum thickness nylon isolation washer. The fasteners shall be suitable for use with fiberglass blanket insulation from 0" to 4" thick.

Wall panel sidelaps shall be stitched by self-tapping carbon steel screws, No. 14 x 3/4" T type "A" or "AB," cadmium or zinc plated, assembled with a .040" minimum thickness nylon isolation washer.

For applications with color finished wall panels, the fasteners shall be color coordinated with a premium coating system which protects against corrosion and weathering.

The base of the wall panel is to be attached to a pre-finished 18ga. minimum thickness structural trim configured to create a sheeting ledge and water stop. This component is to be provided by the building manufacturer.

5.3 Panel Length

All wall panels shall be continuous from sill to roof line except where lengths become prohibitive for handling purposes. Any end laps shall be at least 3."

5.4 Closure Strips

At the eaves, rake and locations where panels end over or under a door, window, louver or other such wall openings, the wall panel corrugations shall be filled with a pre-formed closed-cell laminated polyethylene foam closure when required for weather tightness.

PART 6 - TRIM & ACCESSORIES

6.1 Gutter, Downspouts, Rake & Wall Trim

Exterior gutters shall be 24 gauge, G90 galvanized or aluminum-zinc alloy coated steel with the same finish as the wall panels. Exterior gutter color shall be selected from manufacturer's standards.

Downspouts shall be 28 gauge galvanized or aluminum-zinc alloy coated steel with a color coordinated, pre-painted finish. Downspout color shall be selected from manufacturer's standards.

Rake trim shall be embossed 26 gauge, G90 galvanized or aluminum-zinc alloy coated steel with the same finish as the wall panels. Rake trim color shall be selected from manufacturer's standards. If the roof is a standing seam system, the rake trim shall be attached to the endwall material with a slip joint, allowing the rake to expand and contract with the roof system.

Wall trim shall be embossed 26 gauge (minimum), G90 galvanized or aluminum-zinc alloy coated steel with the same color and finish as the wall panels.

All gutter and downspout joints, rake flashing laps, ridge flashing laps, doors, windows and louvers shall be sealed with caulk, Sika Sikaflex 201 caulk or equal. It shall meet or exceed the requirements of Federal Specification TT-S-00230C, Type II, Class A.

6.2 Base Member & Sills

The base of the wall panel is to be attached to a pre-finished 18ga. minimum thickness structural trim configured to create a sheeting ledge and water stop. This component is to be provided by the building manufacturer.

At sills where the wall panels do not extend to the slab, a pre-painted 0.043" base member or a girt plus flashing detail shall be used, as shown on the bid drawings. Unless clearly stated on the drawings, the base member or girt are not to be designed as a horizontal spandrel bracing the top of any hardwall wainscot.

Fasteners connecting the base member or girt to the foundation or top of the wainscot are not by the building manufacturer.

6.3 Horizontal Sliding Windows

Size and location of all windows shall be as shown on the plans.

Windows shall be horizontal sliding units with a pre-finished frame and furnished complete with 7/16" hermetically sealed double glass, hardware, and half screen. Windows shall be self-flashing to the metal wall panels. They shall conform to ANSI A134.1 and shall be certified by Architectural Aluminum Manufacturers Association for high performance commercial construction, HS-B2-HP.

END OF SECTION 13122

SECTION - 13930
WET-PIPE FIRE-SUPPRESSION SPRINKLERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 1 specification sections, apply to this section.

1.2 GENERAL REQUIREMENTS

- A. Furnish and install complete wet-pipe fire sprinkler system. All work shall be in strict accordance with NFPA 13 complying with requirements with the West Virginia State Fire Marshall as specified in Contract Documents.
- B. This fire protection sprinkler system specification is a performance specification and is intended to establish minimum design and installation guidelines for the work. The contractor shall assume full responsibility for the criteria, design, layout details and installation of all fire protection work to meet the governing code or regulations and the insurance underwriting criteria.

1.3 RELATED SECTIONS

- A. Division 15 – General Mechanical Requirements
- B. Division 15 – Hangers and Supports for Piping and Equipment
- C. Division 15 – Mechanical Identification
- D. Division 15 – Plumbing Piping

1.4 REFERENCES

- A. American Society for Testing and Materials
1. ASTM A 53 - Standard Specification for Pipe, Steel and Hot-Dipped, Zinc-Coated, Welded and Seamless
 2. ASTM A 135 – Electric Resistance Welded Steel Pipe
 3. ASTM A 234 - Standard Specifications for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperature Service
- B. American Society of Mechanical Engineers
1. ASME B 1.20.1 – Pipe Threads, General Purpose
 2. ASME B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings
 3. ASME B 16.3 – Malleable Iron Threaded Fittings
 4. ASME B 16.4 - Cast Iron Threaded Fittings
 5. ASME B 16.5 – Pipe Flanges and Flanged Fittings
 6. ASME Section 9 – Welding and Brazing Qualifications
- C. National Fire Protection Association
1. NFPA 13 - Installation of Sprinkler Systems

2. NFPA 24 – Installation of Private Fire Service Mains and Their Appurteneances

1.5 SYSTEM DESCRIPTION

- A. The Fire Protection System design, components, and installation herein described shall comply with all laws, ordinances, rules and regulations of all local authorities having jurisdiction, and the West Virginia State Fire Marshall, and shall be subject to the approval of these authorities, notwithstanding anything in these specifications to the contrary.
- B. Provide system to meet the NFPA hazard classification noted on the drawings.
- C. Determine volume and pressure of incoming water supply from water flow test data. Revise design when test data is available prior to submittals. The Contractor shall obtain or have flow tests made to determine existing flow and pressure data relative to this project. All costs for flow tests or water test data shall be included under this Contract. Testing fire protection system flows shall be coordinated with the General Contractor and Owner. The Contractor shall notify the Architect in writing 7 days prior to the test date. The Logan County PSD is the water purveyor for this site.
- D. Coordinate system with building fire alarm system(s). Sprinkler alarm devices shall be provided by the sprinkler contractor.
- E. Provide fire department connections.
- F. All systems shall be fully automatic and shall be complete in all detail and shall be provided with all the required components and devices necessary to install approved systems.
- G. The system piping shall be sized for the system to operate with available system pressure. If a fire pump is deemed necessary, it shall be included in the contractor's bid price and space allocation shall be coordinated with the Architect in the early stages of the project prior to the start of construction.
- H. The drawings and specifications are intended for bidding and coordination purposes only and are not intended to cover each and every item required for complete, approved systems, although it is the intent that a complete system be installed.
- I. Hydraulic calculations shall include all forms and all information required per NFPA 13 for all areas calculated. This includes, but is not limited to the summary sheets, detailed work sheets and graph sheets.

1.6 SUBMITTALS

- A. Shop Drawings
 - 1. Size sprinkler system by the following method:
 - a. Hydraulic calculation design method based on water supply evaluation performed at building site.
 - 2. Submittal Procedure
 - a. After award of contract and prior to purchase of equipment, submit six sets of shop drawings with specifications and hydraulic calculations to Architect and two sets to the WV State Fire Marshall and local jurisdiction having authority for fire prevention for review.

- b. After integrating Fire Marshall, Architect's and local jurisdiction's comments into drawings, licensed certified fire protection engineer of record submitting fire sprinkler system design construction documents shall stamp, sign, and date each sheet of shop drawings and first page of specifications and calculations.
- c. Submit stamped documents to area office and local jurisdiction having authority for fire prevention for final approval.
- d. After final approval, submit four copies of approved stamped documents to Architect.
- e. Failure of system to meet requirements of the Fire Marshal and/or authority having jurisdiction shall be corrected at no additional cost to Owner.

B. Closeout

- 1. Record actual locations of sprinkler heads and deviations of piping from drawings. Indicate drain and test locations.
- 2. Operation and Maintenance Manual Data
 - a. Modify and add to requirements of Division 1 as follows:
 - 1) Provide master index showing items included.
 - 2) Provide name, address, and phone number of Architect, Architect's fire sprinkler consultant, general contractor, and fire protection subcontractor.
 - 3) Provide operating instructions to include
 - a) General description of fire protection system
 - b) Step by step procedure to follow in putting system into operation.
 - 4) Maintenance instructions shall include
 - a) List of system components used indicating name and model of each item.
 - b) Manufacturer's maintenance instructions for each component installed in project. Instructions shall include installation instructions, part numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
 - 5) Include copies of approved shop drawings and copies of required warranties.
 - 3. If system has both wet and dry segments, provide single Operations and Maintenance Manual for total Fire Suppression System.

1.7 QUALITY CONTROL

A. Qualifications

- 1. Designer
 - a. Licensed fire protection engineer certified by NICET to level three minimum and engaged in design of fire protection systems. Engineer shall
 - 1. Be responsible for overseeing preparation of shop drawings, hydraulic calculations where applicable, and system installation.
 - 2. Make complete inspection of installation.
 - 3. Provide corrected record drawings to Owner with letter of acceptance.
 - 4. Certify that installation is in accordance with Contract Documents.
- 2. Installer – Licensed by jurisdiction having authority over installed fire protection systems for location of Project. Furnish verified list of similar projects installed during the past 5 years minimum.

3. Employ certified welders in accordance with ASME Section 9.
4. Piping materials shall be new and of the best quality of their respective kinds. They shall conform to the requirements and ordinances of the federal, state, and local governments and the insurance authorities having jurisdiction.
5. Employ workmen of the proper labor affiliation and classification for this phase of work.

B. Requirements of regulatory Agencies

1. Unless noted otherwise, system shall conform to
 - a. NFPA 13
 - b. NFPA 24
 - c. NFPA 101
 - d. Requirements of local water department and local authority having jurisdiction for fire protection.
 - e. Applicable rules, regulations, laws and ordinances.
 - f. Underwriter's Laboratories Publication, "Fire Protection Equipment Directory".
 - g. Comply with backflow prevention requirements and, if required, include device in hydraulic calculations.
 - h. Secure and pay for all permits and fees necessary to initiate and complete the work under this contract.

1.8 OWNER'S INSTRUCTIONS

- A. Instruct building maintenance personnel and Owner's representative in operation and maintenance of system utilizing Operation and Maintenance Manual when so doing. Minimum instruction period shall be four hours.
- B. Instruction period shall occur after Substantial Completion Inspection when system is properly working and before final payment is made.
- C. Provide a material and test certification to the Owner at the completion of the project.

1.9 EXTRA MATERIALS

- A. Provide extra sprinkler heads of each type under provisions of NFPA 13.
- B. Provide suitable wrenches for each type of sprinkler head.

PART 2 – PRODUCTS

2.1 COMPONENTS

- A. Steel Pipe, Above grade
 1. ASTM A53, Black steel.
 - a. 2 inches and smaller – Threadable thinwall welded, screwed, flanged, or roll grooved coupling system.
 - b. 2 inches and larger – Schedule 10 welded, flanged or roll grooved coupling system.
- B. Fittings

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1. Screwed – Cast iron meeting requirements of ANSI B 16.4
2. Flanged – Cast iron meeting requirements of ANSI B 16.1
3. Welded – Carbon steel meeting requirements of ASTM A 234
4. Roll grooved pipe coupling system
 - a. Approved manufacturers
 - 1) Gustin Bacon
 - 2) ITT Grinnell Coupling
 - 3) Victaulic Coupling

C. Valves

1. Butterfly valves
 - a. UL / FM approved
 - b. Indicating type
 - c. Approved manufacturers and models
 - 1) Mueller
 - a) B-3250-00 Water type with valve tamper switch
 - b) B-3250-52 Grooved ends type with valve tamper switch
 - 2) Nibco
 - a) WD3510-4 Water type with valve tamper switch
 - b) GD1765-4 Grooved type with valve tamper switch
 - 3) Norris – NW285AC-2K Water type with optional tamper switch
 - 4) Pratt – IBV
2. Gate valves
 - a. UL / FM approved
 - b. Outside screw and yoke type (O,S&Y)
 - c. Class 150 psi
 - d. Approved manufacturers and models
 - 1) Nibco – F-637-31 Flanged ends
 - 2) Mueller – A2073-6 Flanged ends
3. Ball valves
 - a. UL / FM approved
 - b. Valve tamper switch
 - c. Approved manufacturers and models
 - 1) Milwaukee – BBSC with threaded ends
 - 2) Nibco – T-505 with threaded ends
 - 3) Nibco – G-505 with grooved ends
4. Swing check valves
 - a. ½ to 3 inch horizontal check
 - b. Regrinding type
 - c. Renewable disk
 - d. Bronze Class 125 with threaded ends
 - e. Approved manufacturers and models
 - 1) Nibco – KT-403-W
 - 2) Walworth – Figure 412
5. Swing check valves
 - a. 2½ to 12 inch horizontal check
 - b. Bolted bonnet
 - c. Raised face flanges
 - d. Bronze mounted with ductile iron body
 - e. 125 lb. Class A
 - f. Approved manufacturers and models

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- 1) Nibco – F-938-31
- 2) Walworth – Fig 883F
- 3) Mueller – A-2120-6
6. Wafer type check valves
 - a. 4 to 8 inch cast iron body
 - b. 175 psi minimum working pressure
 - c. Rubber seat
 - d. Approved manufacturers and models
 - 1) Nibco W-900-W
 - 2) Mueller – A-2102
7. Alarm Check Valves
 - a. Approved manufacturers and models
 - 1) Reliable – E with gauges and drain
 - 2) Viking – E-1 with gauges and drain
 - 3) Star – F with gauges and drain
8. Retard Chamber
 - a. Self draining
 - b. Approved manufacturers and models
 - 1) Reliable – E-1
 - 2) Viking – C
 - 3) Star – D
9. Inspector's Test Valve
 - a. Ductile iron body with threaded ends
 - b. Combination sight glass / orifice
 - c. Bronze top works
 - d. Approved manufacturers and models
 - 1) Victaulic – Testmaster Alarm Test Module Style 718

D. Sprinkler Heads

1. Concealed wet pendant
 - a. Flush ceiling profile
 - b. Adjustable cover
 - c. UL / FM approved
 - d. Coordinate concealed cover finish with Architect.
 - e. Approved manufacturers and models
 - 1) Reliable – G-4 “Adjustable Concealer”
 - 2) Viking – Model “Horizon Image”
 - a) Sprinkler base – Part No. 08281
 - b) Cover Assembly – Part No. 08310
2. Horizontal sidewall sprinkler
 - a. UL / FM approved
 - b. Recess adjustable
 - c. Use Viking A-1 chrome plated sprinkler guard where guards are required.
 - d. Approved manufacturers and models
 - 1) Reliable – F-1 with Reliable recessed, 2-piece escutcheon Model GF1
 - 2) Viking – M HSW with Viking recessed, 2-piece escutcheon Model E-1
 - 3) Star – Model LD-2 with Star Nova Series recessed escutcheon.
3. Pendant and upright sprinkler
 - a. UL / FM approved
 - b. Pool Area Head Finish: Brass, Teflon or Poly-coated.
 - c. Exposed Area Type Head Finish (Non-Pool Areas): Brass, Chrome Plated.

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- d. Use Reliable C-1 chrome plated sprinkler guard where guards are required
 - e. Use Reliable C flush chrome escutcheon
 - f. Approved manufacturers and models
 - 1) Reliable – G
 - 2) Viking – M
 - 3) Central – A
 - 4) Star – E
4. Adjustable drop nipple
- a. Steel tube, oxide coated
 - b. Double O-ring seal
 - c. 175 psi minimum working pressure
 - d. Approved manufacturers and models
 - 1) CECA – Cold extrusion Company of America
 - 2) Central – “Alpha”
- E. Water flow alarm
- 1. Mechanical flow alarm – Water gong
 - a. UL / FM approved
 - b. Approved manufacturers and models
 - 1) Reliable – C
 - 2) Viking – F-1
 - 3) Central – F
 - 4) Star – CD
- F. Pressure Gauges
- 1. Mechanical water pressure gauges
 - a. UL / FM approved
 - b. 3½ inch diameter dial
 - c. 0 to 300 psi in 5 psi increments
 - d. Gage Cock: Tee or lever handle, brass rated for maximum 300 psig.
 - e. Approved manufacturers and models
 - 1) Reliable – UA
 - 2) Trerice – 500
- G. Pressure detectors
- 1. Electrical water pressure switch
 - a. UL / FM approved
 - b. Switch activates on pressure rise between 4 and 8 psi
 - c. Two single pole double throw switches
 - d. Automatic reset
 - e. Approved manufacturers and models
 - 1) Reliable – J54-8295
 - 2) Potter Electric Signal Co. – PS10
- H. Tamper switch
- 1. Weather and tamper resistant switch
 - a. UL / FM approved
 - b. Two single pole double throw switches
 - c. Approved manufacturers and models
 - 1) Potter Electric Signal Co. – PCVS

- I. Flow switches
 - 1. Vane Type water flow switch with red enamel finish and cast aluminum enclosure, two sets of S.P.D.T. (Form C) contacts, flow sensitivity adjustment, and adjustable pneumatic retard.
 - 2. Acceptable Manufacturers
 - a. Pittway Corp.; System Sensor Div.
 - b. Potter Electric Signal Co.

- J. Pressure Switches
 - 1. Pressure switch for monitoring dry pipe and wet alarm check valves, ½ inch male NPT pressure connection, two sets of S.P.D.T. (Form C) contacts, cover tamper switch, and adjustable differential.

- K. Valve Monitor Switches
 - 1. Valve monitor switch for OS&Y valves, two sets of S.P.D.T. (Form C) contact, and tamper resistant cover that causes the switch to operate when removed.
 - 2. Valve monitor switch for fire protection control valves, two sets of S.P.D.T. (Form C) contacts, and tamper resistant cover.

- L. Fire Department Connection
 - 1. Two-way Y-type inlet with single clapper, 2 ½ inch size, UL 405, 175 psig minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads matching local fire department sizes and threads.
 - 2. Finish: Cast Brass.
 - 3. ¾ inch straight design automatic drain device by Potter-Roemer Fig. 5982.
 - 4. Round "AUTO. SPKR." Identification plate, polished brass by Potter-Roemer Fig. 5962.
 - 5. Approved Manufacturers and Models
 - a. Potter-Roemer – Fig. 5720
 - b. Elkhart Brass
 - c. Powhatan

- M. Double Check Detector Assemblies
 - 1. Over 2 inches: Cast iron, 175 WWP, bronze seats, replaceable rubber clappers, pair of OS&Y iron gate valves, bypass meter and check valve assembly, test cocks, and one air vent per check valve.
 - a. Acceptable manufacturers:
 - 1) Ames
 - 2) Febco
 - 3) Hersey
 - 4) Watts
 - 5) Wilkins

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Drawings
 - 1. Fire Protection drawings shall show general arrangement of piping. Follow as closely as actual building construction and work of other trades will permit.

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2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Fire Protection Drawings.
3. It is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

3.2 INSTALLATION

- A. Follow general piping installation requirements specified in Division 15.
- B. Install piping in accordance with manufacturer's recommendations, and NFPA 13 for sprinkler systems and NFPA 14 for standpipe and hose systems. Support piping in accordance with NFPA 13.
- C. Provide sleeves when penetrating footings, floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- D. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- E. Route piping in orderly manner and maintain gradient.
- F. Provide clearance for access to valves and fittings.
- G. Slope piping and arrange to drain at low points.
- H. Install system to drain. Drain trapped piping in accordance with NFPA 13.
 1. Install main drain from riser
 2. Install auxiliary drains in low points of piping system and inspector's test valve drain to mechanical pad located outside building unless otherwise directed by Architect.
- I. Install piping system so it will not be exposed to freezing temperatures.
- J. Do not use dropped, damaged or used sprinkler heads.
- K. Install tamper switches and pressure flow detectors where located by Architect.
- L. Install water powered motor gong on exterior wall in accordance with Manufacturer's instructions.
- M. Install automatic ball drip device in lowest point of piping to fire department connection and drain to exterior of building.
- N. Brace and support system to meet seismic zone requirements for building site.
- O. All exposed black steel sprinkler piping will be painted with structure. Contractor shall coordinate with general contractor and ensure that all sprinkler heads are protected prior to painting.

3.3 FIELD QUALITY CONTROL

A. Site tests

1. This Contractor shall furnish all labor and equipment and shall conduct and bear the cost of all required tests of the fire protection systems. He shall give all concerned parties seven days advance notice of scheduled tests.
2. Tests shall be witnessed by the Owner, the Architect, a representative of local jurisdiction over fire prevention, and any other parties directly concerned.
3. Test system in accordance with NFPA codes and local authority having jurisdiction. All defective work shall be promptly repaired or replaced with new pipe and fittings.
4. Tests shall be repeated until the installation receives the approval of the Architect and all parties concerned.
5. Any damage resulting from the tests shall be repaired and/or damaged materials replaced, all to the satisfaction of the Architect, at the expense of this Contractor.
6. Test blanks shall have red painted lugs protruding beyond flange to clearly indicate their presence and be numbered to assure their removal when testing is completed.

C. Certificate of Occupancy

1. Notify Fire Marshal thirty (30) days before anticipated substantial completion of the work to inspect work for compliance with requirements of the WV Fire Marshal.
2. Provide all work required by the WV State Fire Marshal's Field Inspector and/or local authority necessary to obtain a Certificate of Occupancy at no additional cost to Owner.

END OF SECTION

CHIEF LOGAN
STATE PARK

CONTRACTOR:
SUMMIT
ELECTRIC
P.O. BOX 254
HURRICANE, W.VA.
25526
304/562-7091

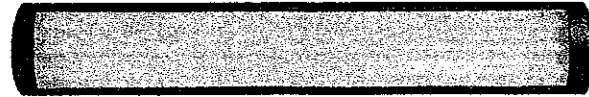
Type No. A
 Catalog No. PVWO254BS2YW
 Job. Name CHIEF LOGAN STATE PARK

ProTector™ V Series

4-Foot Linear Fluorescent Vandal-Resistant Lighting Fixture

APPLICATIONS

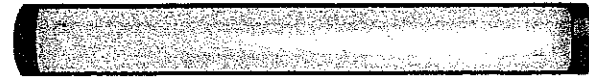
- Ideal for high-traffic areas requiring architectural surface-mounted luminaires that withstand intentional vandalism



11" Wide Model

CONSTRUCTION

- Marine-grade, extruded aluminum housing
- Tamper-resistant stainless steel hardware
- Architectural die-cast end caps
- Polyester powder, semi-gloss textured finish
- Fade-resistant color (custom colors available – consult factory)
- Standard color is white

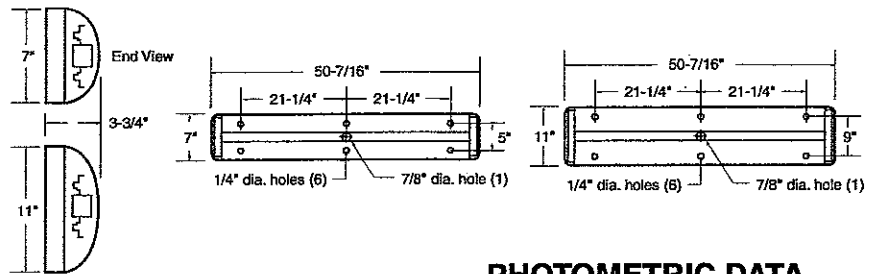


7" Narrow Model

ELECTRICAL

- High-Efficiency T5, T5HO and T8 lamping
- Exceptionally high fixture efficiency
- 91.7% maintained lumens
- Extremely high CRI of 85
- Immediate hot re-strike
- Greater uniformity
- No color shift
- Instant-on

DIMENSIONAL DATA



OPTICS

- 2', 4' and 8' sizes in T5, T5HO or T8 configurations
- Extruded impact-resistant polycarbonate lens
- Delivers uniform illumination without glare
- Available in clear prismatic and opal prismatic

MOUNTING

- Available direct from factory
- No field drilling required

WARRANTY/LISTINGS

- "LifeLyte" limited lifetime warranty
- UL/CUL listed for wet locations

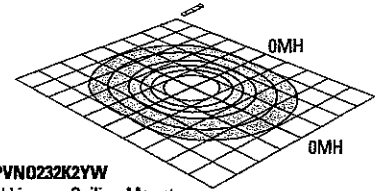


BALLAST MATRIX

# Lamps	Wattage	Source	Ballast
2	28w	T5	N2Y
	32w	T8	K2Y
	54w	T5HO	S2Y
3	28w	T5	N6Y
	32w	T8	K3Y
	54w	T5HO	S3Y
4	28w	T5	N8Y
	32w	T8	K4Y
	54w	T5HO	S4Y

PHOTOMETRIC DATA

Mounting Height = 8 ft.
 Gridscale = 8 ft. per increment



PVNO232K2YW
 4' Linear - Ceiling Mount
 2-32w T8 fluorescent

Horizontal Footcandles
 Lumen/Lamp = 2,850
 Light Loss Factor = 1.00

1 FT-C	2 FT-C	5 FT-C	1 FT-C	2 FT-C	5 FT-C
--------	--------	--------	--------	--------	--------

Ordering Guide Example: PVNO2321K2YBF

P	VN	O	2	32	1	K2Y	B	F
P	VW	O	2	54	B	S2Y	W	
Series	Style	Lens	Lamp #	Watts	Volts	Ballast	Color*	Options

P=ProTector Linear
 VN=Narrow (7")
 VW=Wide (11")
 O=Opal Poly
 C=Clear Poly
 2 (7" Narrow)
 3 (11" Wide)
 4 (11" Wide)
 28 (T5)
 32 (T8)
 54 (T5HO)
 1=120v
 7=277v
 B=Univ
 See Ballast Matrix Above
 B=Black
 W=White
 P=Bronze
 2C=2 Circuit
 3C=3 Circuit
 F=Fused
 RB=Row Beginning
 RM=Row Middle
 RE=Row End
 PC=Photo Control
 Battery Back-Up
 Consult Factory for Availability

* Custom colors available. Consult factory.

Row Mounting:

Factory engineered to speed row mounting applications. When ordering, make note that all row mounting options require 1 RB and 1 RE style to begin and end the run. 1 or multiple RM styles can be used. For shorter runs, an RB will mount to an RE style unit.

Product information is subject to change without notice.



Type No. A1
 Catalog No. PVWO254BS2YW/EMB50
 Job. Name CHIEF LOGAN STATE PARK

ProTector™ V Series

4-Foot Linear Fluorescent Vandal-Resistant Lighting Fixture

APPLICATIONS

- Ideal for high-traffic areas requiring architectural surface-mounted luminaires that withstand intentional vandalism

CONSTRUCTION

- Marine-grade, extruded aluminum housing
- Tamper-resistant stainless steel hardware
- Architectural die-cast end caps
- Polyester powder, semi-gloss textured finish
- Fade-resistant color (custom colors available – consult factory)
- Standard color is white

ELECTRICAL

- High-Efficiency T5, T5HO and T8 lamping
- Exceptionally high fixture efficiency
- 91.7% maintained lumens
- Extremely high CRI of 85
- Immediate hot re-strike
- Greater uniformity
- No color shift
- instant-on

OPTICS

- 2', 4' and 8' sizes in T5, T5HO or T8 configurations
- Extruded impact-resistant polycarbonate lens
- Delivers uniform illumination without glare
- Available in clear prismatic and opal prismatic

MOUNTING

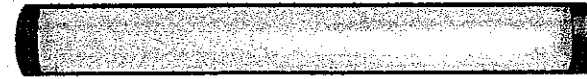
- Available direct from factory
- No field drilling required

WARRANTY/LISTINGS

- "LifeLyte" limited lifetime warranty
- UL/CUL listed for wet locations

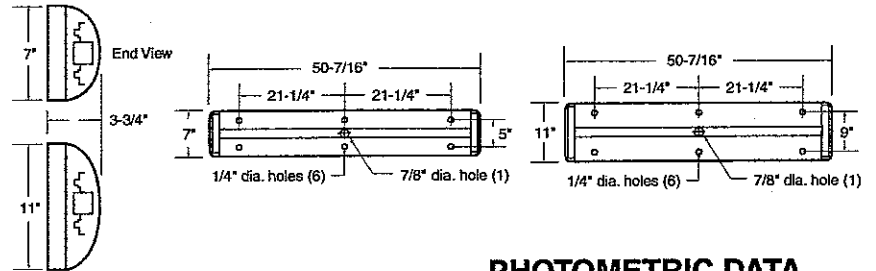


11" Wide Model



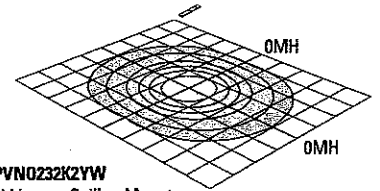
7" Narrow Model

DIMENSIONAL DATA



PHOTOMETRIC DATA

Mounting Height = 8 ft.
 Gridscale = 8 ft. per increment



PVNO232K2YW
 4' Linear - Ceiling Mount
 2-32w T8 fluorescent

Horizontal Footcandles
 Lumen/Lamp = 2,850
 Light Loss Factor = 1.00

1 FT-C	2 FT-C	5 FT-C	1 FT-C	2 FT-C	5 FT-C
--------	--------	--------	--------	--------	--------

BALLAST MATRIX

# Lamps	Wattage	Source	Ballast
2	28w	T5	N2Y
	32w	T8	K2Y
	54w	T5HO	S2Y
3	28w	T5	N6Y
	32w	T8	K3Y
	54w	T5HO	S3Y
4	28w	T5	N8Y
	32w	T8	K4Y
	54w	T5HO	S4Y

Ordering Guide Example: PVNO2321K2YBF

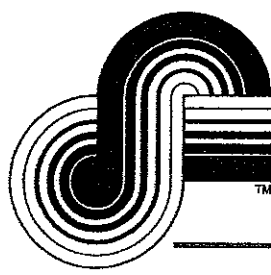
Series	Style	Lens	Lamp #	Watts	Volts	Ballast	Color*	Options
P	VN	O	2	32	1	K2Y	B	F
P	VW	O	2	54	B	S2Y	W	ER

* Custom colors available. Consult factory.

Row Mounting:

Factory engineered to speed row mounting applications. When ordering, make note that all row mounting options require 1 RB and 1 RE style to begin and end the run. 1 or multiple RM styles can be used. For shorter runs, an RB will mount to an RE style unit.





FORUM TEMPO I

U.S. PATENT #4,293,900

TWR-1000/1MH-PR-a-24DB
TWR-1000/1MH-PR-a-24FB

FORUM/TEMPO achieves a new level of quality indirect lighting. The Tempo reflector is a multi faceted prefocused, specular parabolic design. The individual segments of highly polished aluminum guarantee complete control of lumen output to yield the widest, most uniform distribution pattern of any indirect lighting system on the market today.

Applications: Tennis courts, gymnasiums, natatoriums, factory assembly areas and any high ceiling large area applications.

Mounting height: Because of the reflector's unique ability to distribute light over a wide, uniform area, Forum/Tempo can be mounted closer to the ceiling than any other indirect lighting system. Distance from the ceiling to the top of the reflector housing can be a minimum of 48".

SPECIFICATION:

Optical System - Shall consist of 16 individual highly polished aluminum reflector segments. Each segment is hydro-formed with 8 prefocused linear parabolic surfaces. Each surface is concave to minimize the amount of light that passes through the arc tube of the lamp.

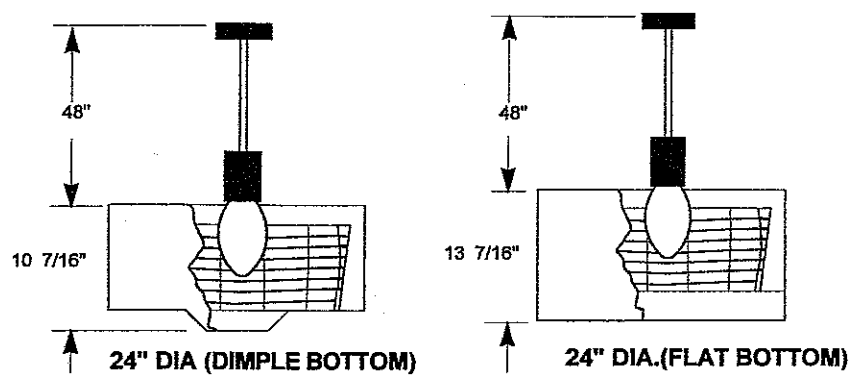
Housing - Shall be spun from 18 ga. steel (standard finish white). The shroud shall be hung from a single stem. The shroud shall be attached to the stem assembly with aircraft cable and can be serviced without tools.

Ballast - Shall be an indoor encased constant wattage auto transformer for remote mounting only.

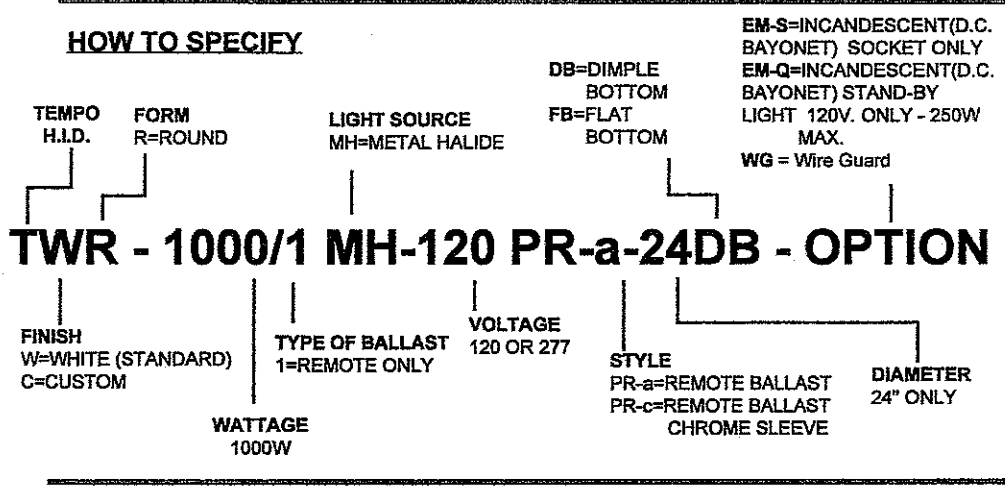
Square Housing - Available: 25" Sq. x 13 7/16" H.

PRODUCT LISTING: Shall be U.L. listed.

See **TEMPO I** mounting and accessories sheet.

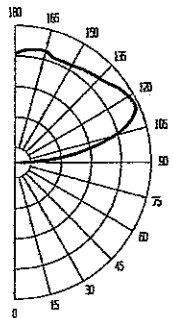


HOW TO SPECIFY



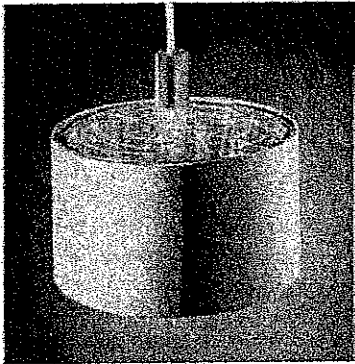
CANDLEPOWER SUMMARY

CATALOG NO.: TWR-1000 /1MH 24DB
LAMP TYPE: MH1000/C/U
LUMENS: 100,000
FIXTURE EFFICIENCY: 62.7%
LUMINAIRE INPUT WATTS: 1070
TEST REPORT NO.: B.A.L. 1509.0



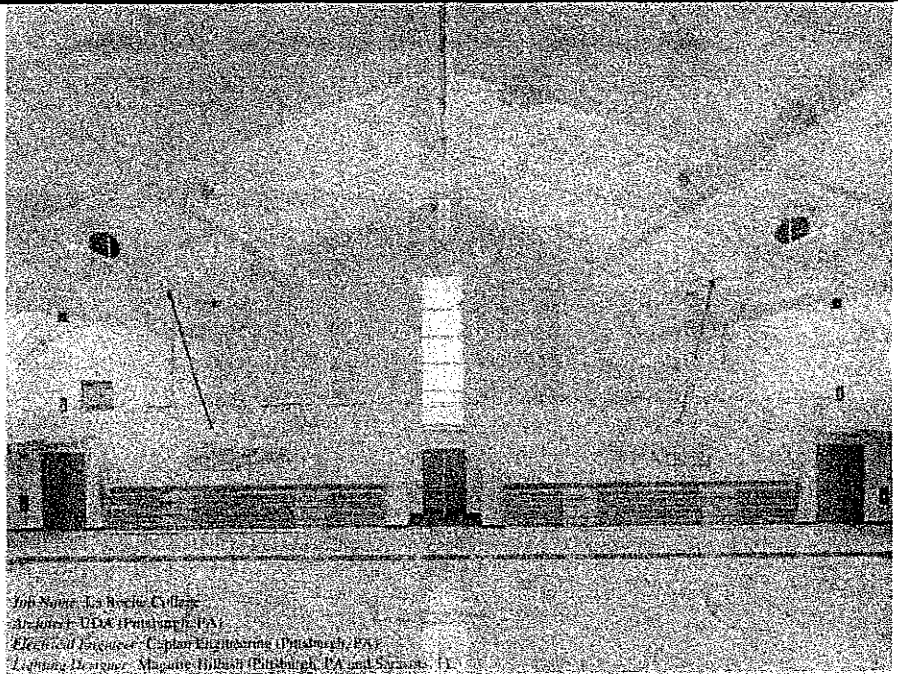
ANGLE CANDELA LUMENS

180	7588	
175	8093	773
165	8666	2457
155	8310	3846
145	9306	5846
135	12182	9435
125	15864	14233
115	15907	15789
105	8310	8791
95	1366	1490
90	199	
85	0	0
75	0	0
65	0	0
55	0	0
45	0	0
35	0	0
25	0	0
15	0	0
5	0	0
0	0	0



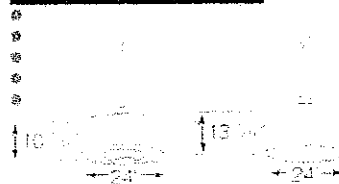
Catalog No.
TWR-1000-1/MH-
120 PR-a-24FB-WG

Wire Guard option.
Specify: WG



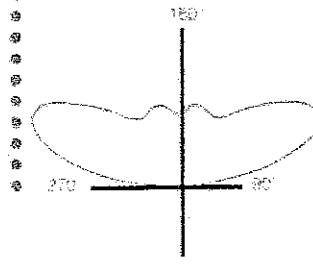
*Job Site: La Roche College
Location: U.S.A. (Pittsburgh, PA)
Electrical Engineer: Captain Engineering (Pittsburgh, PA)
Lighting Designer: Alsquare (Pittsburgh, PA) and Syracuse, PA*

Available Size



Distribution Pattern

• **Catalog No.**
• **TWR-1000MH**
• B.A.L. Test No. 1509



The Tempo 1/1000 Watt is a luminaire designed to accommodate large areas; high ceiling applications where the use of 1000 Watt MH or Sodium can achieve the desired footcandle level with a minimum of luminaires. The patented reflector (Pat. 4-293-900) system permits installation as close as 48" from the ceiling.

Applications: Tennis Courts, Factories, Gymnasiums, Natatoriums and any high ceiling large area applications

How To Specify

-
-
-
-

Indicates Tempo H.I.D.

Indicates Form
R=Round
S=Square
(Consult factory)

Light Source
MH=Metal Halide
HPS=High Pressure Sodium

DB=Dimple Bottom
FB= Flat Bottom

EM-S=Incandescent Socket Only
EM-Q=Incandescent Stand-By Light 120V Only 250W Max.
WG=Wire Guard

TWR - 1000/1 MH - 120 PR-a - 24DB - OPTION

Indicates Wattage
1000W

Type of Ballast
Remote Only

Style
PR-a=Remote Ballast
PR-q=Remote Ballast
Chrome Sieve

24" Dia. Only

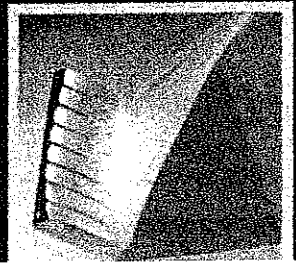
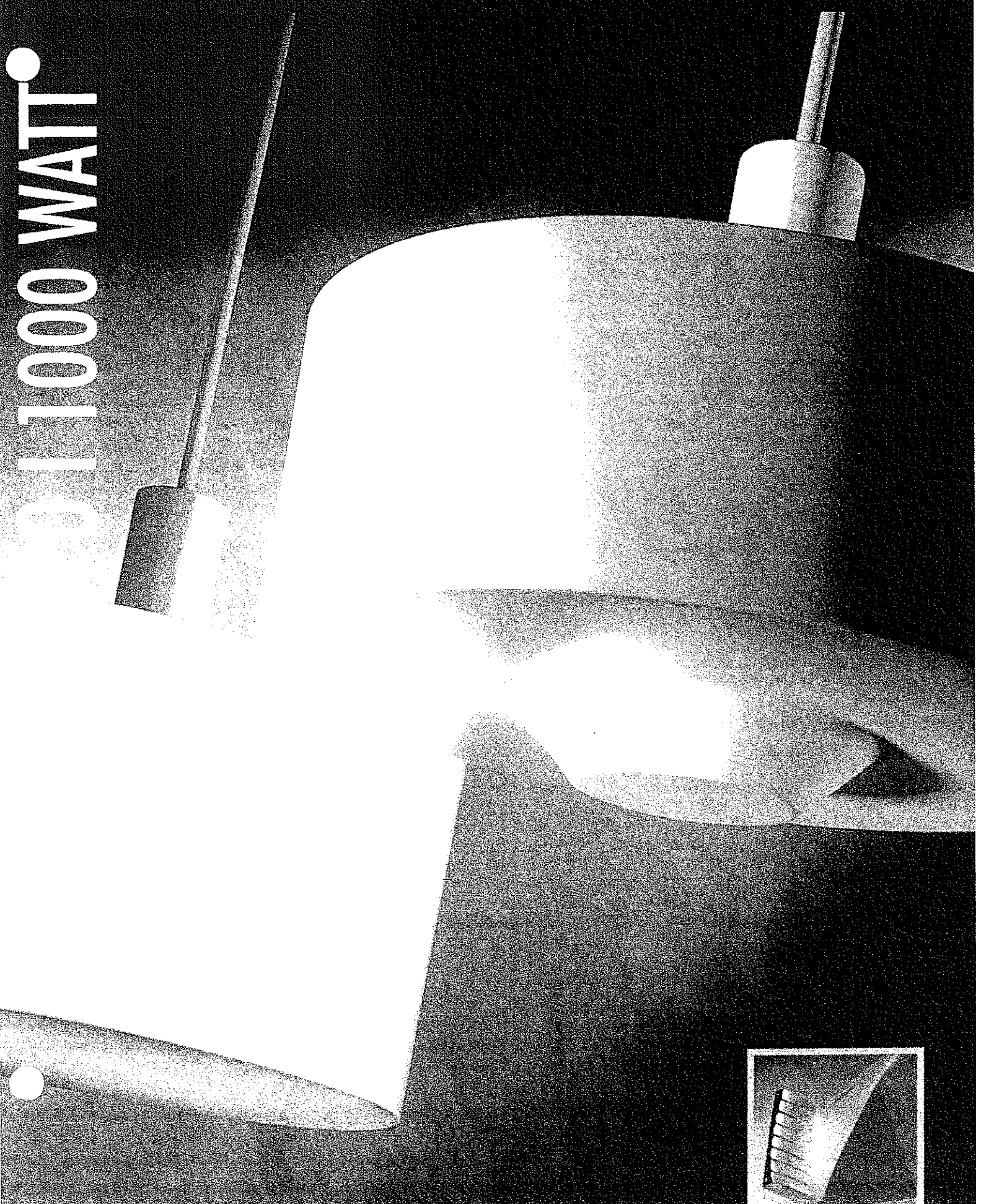
Indicates Finish
W=White (Standard)
C=Custom

Voltage
120V or 277V



FORUM, INC. PITTSBURGH, PA

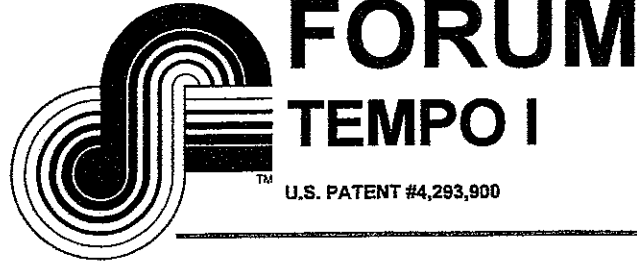
311000 WATT



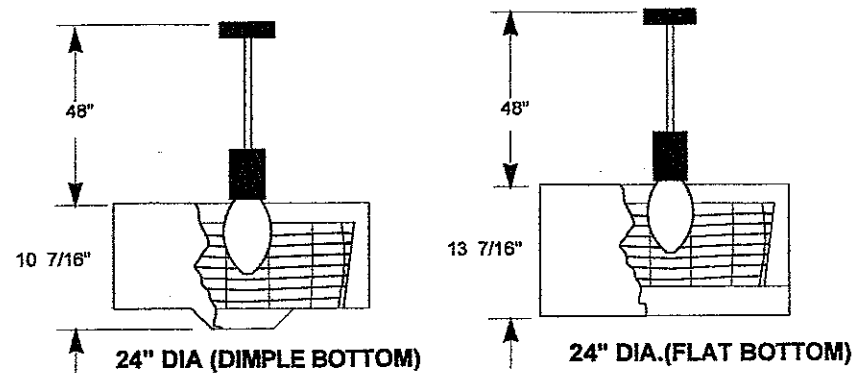
1 type B1

TWR-1000/1MH-PR-a-24DB
TWR-1000/1MH-PR-a-24FB

GRS



FORUM/TEMPO achieves a new level of quality indirect lighting. The Tempo reflector is a multi faceted prefocused, specular parabolic design. The individual segments of highly polished aluminum guarantee complete control of lumen output to yield the widest, most uniform distribution pattern of any indirect lighting system on the market today.



Applications: Tennis courts, gymnasiums, natatoriums, factory assembly areas and any high ceiling large area applications.

Mounting height: Because of the reflector's unique ability to distribute light over a wide, uniform area, Forum/Tempo can be mounted closer to the ceiling than any other indirect lighting system. Distance from the ceiling to the top of the reflector housing can be a minimum of 48".

SPECIFICATION:

Optical System - Shall consist of 16 individual highly polished aluminum reflector segments. Each segment is hydro-formed with 8 prefocused linear parabolic surfaces. Each surface is concave to minimize the amount of light that passes through the arc tube of the lamp.

Housing - Shall be spun from 18 ga. steel (standard finish white). The shroud shall be hung from a single stem. The shroud shall be attached to the stem assembly with aircraft cable and can be serviced without tools.

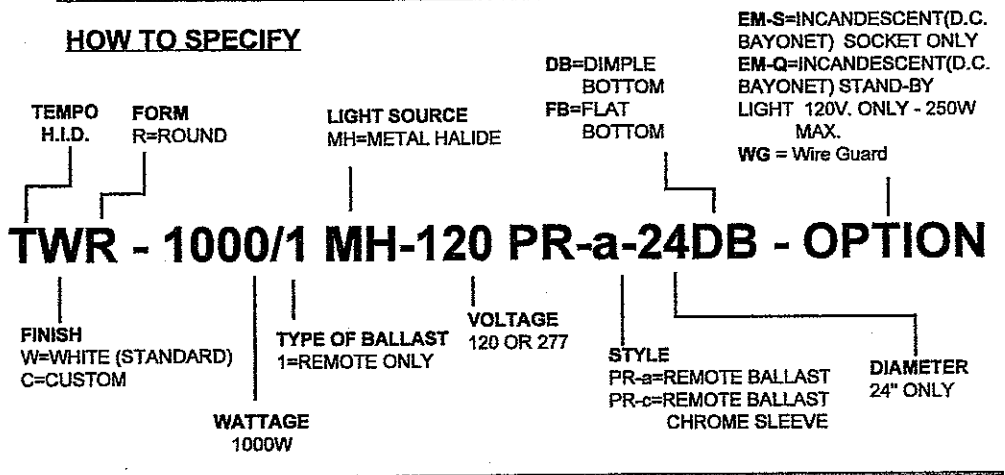
Ballast - Shall be an indoor encased constant wattage auto transformer for remote mounting only.

Square Housing - Available: 25" Sq. x 13 7/16" H.

PRODUCT LISTING: Shall be U.L. listed.

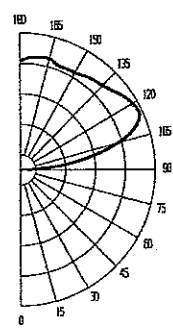
See TEMPO I mounting and accessories sheet.

HOW TO SPECIFY

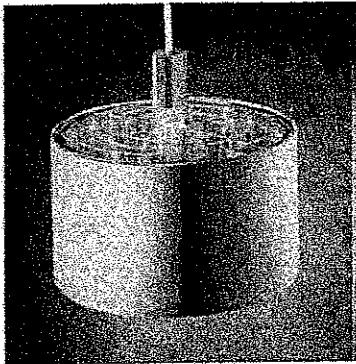


CANDLEPOWER SUMMARY

CATALOG NO.: TWR-1000 /1MH 24DB
LAMP TYPE: MH1000/C/U
LUMENS: 100,000
FIXTURE EFFICIENCY: 62.7%
LUMINAIRE INPUT WATTS: 1070
TEST REPORT NO.: B.A.L. 1509.0

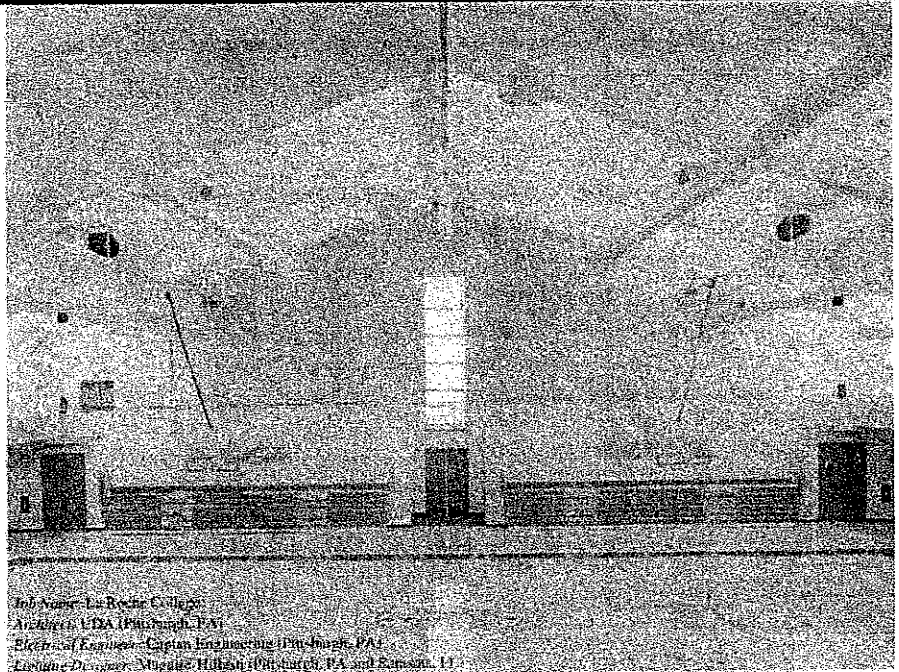


ANGLE CANDELA LUMENS		
180	7588	
175	8093	773
165	8666	2457
155	8310	3846
145	9306	5846
135	12182	9435
125	15864	14233
115	15907	15789
105	8310	8791
95	1366	1490
90	199	
85	0	0
75	0	0
65	0	0
55	0	0
45	0	0
35	0	0
25	0	0
15	0	0
5	0	0
0	0	0



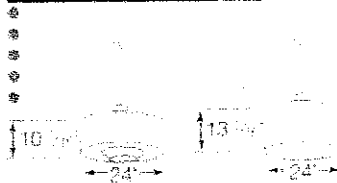
Catalog No.
TWR-1000-1/MH-
120 PR-a-24FB-WG

Wire Guard option.
Specify: WG



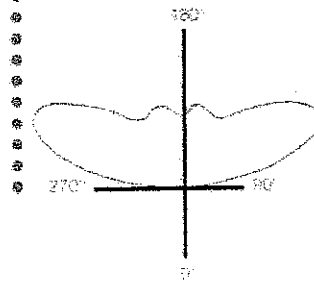
Job Name: La Roche College
Architect: UDA (Pittsburgh, PA)
Electrical Engineer: Caplan Engineering (Pittsburgh, PA)
Landscape Designer: Muegge Hillman (Pittsburgh, PA and Saratoga, NY)

Available Size



Distribution Pattern

* Catalog No.
* **TWR-1000MH**
* B.A.L. Test No. 1509



How To Specify

Indicates
Tempo
H.I.D.

Indicates Form
R=Round
S=Square
(Consult Factory)

Light Source
MH=Metal Halide
HPS=High Pressure
Sodium

DB=Dimple Bottom
FB= Flat Bottom

EM-S=Incandescent
Socket Only
EM-Q=Incandescent
Stand-By Light
120V Only
250W Max.
WG=Wire Guard

The Tempo 1/1000 Watt is a luminaire designed to accommodate large areas; high ceiling applications where the use of 1000 Watt MH or Sodium can achieve the desired footcandle level with a minimum of luminaires. The patented reflector (Pat. 4-293-900) system permits installation as close as 48" from the ceiling.

Applications: Tennis Courts, Factories, Gymnasiums, Natatoriums and any high ceiling large area applications

TWR - 1000/1 MH - 120 PR-a - 24DB - OPTION

Indicates
Wattage
1000W

Type of Ballast
Remote Only

Style
PR-a=Remote Ballast
PR-c=Remote Ballast
Chrome Sleeve

24" Dia. Only

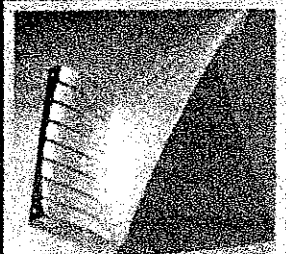
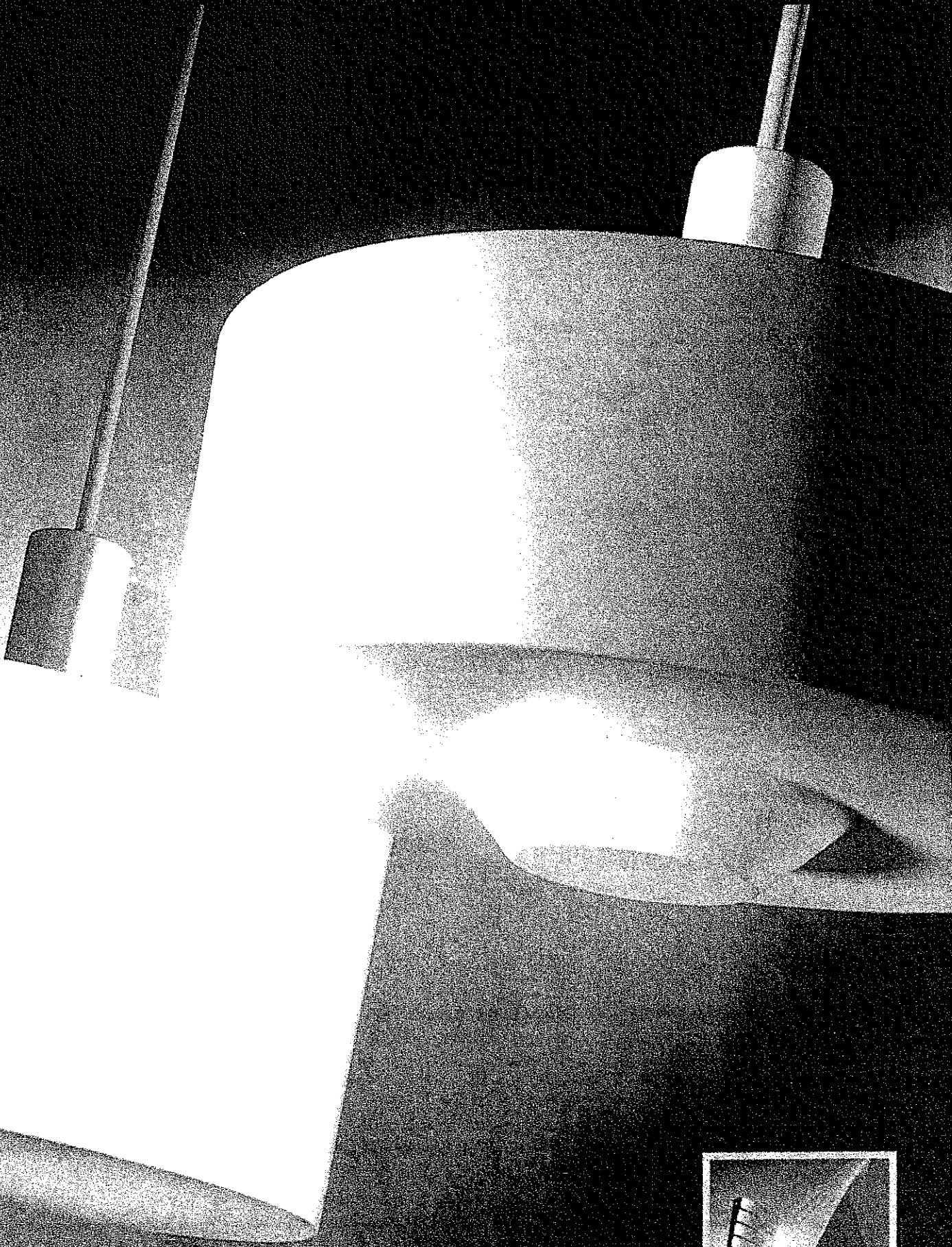
Indicates Finish
W=White (Standard)
C=Custom

Voltage
120V or 277V



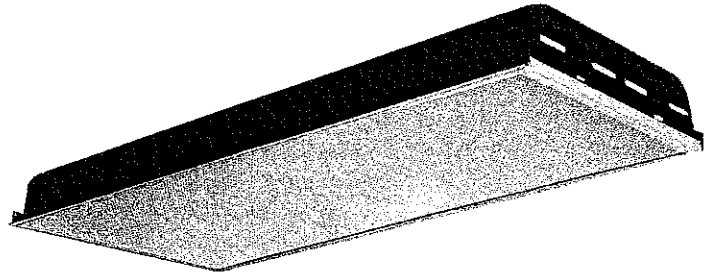
FORUM, INC. PITTSBURGH, PA

10 | 1000 WATT

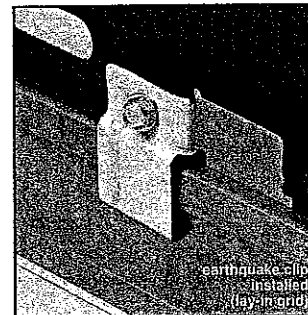
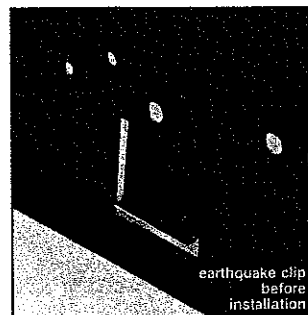
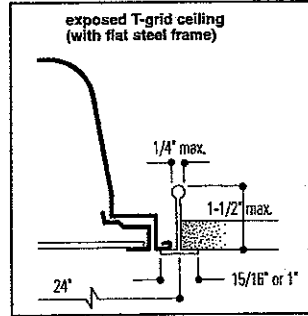
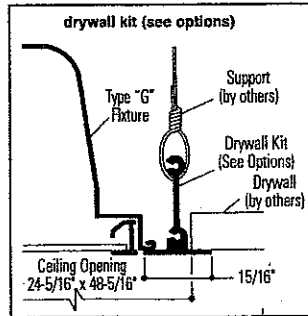
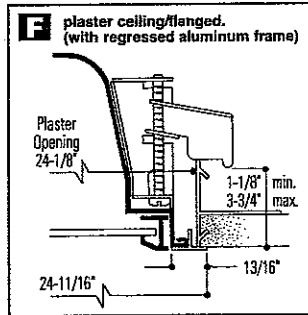
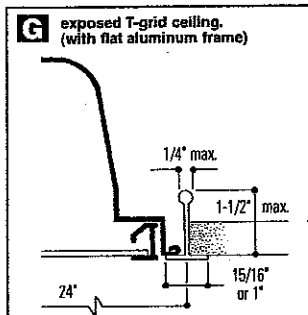


Features

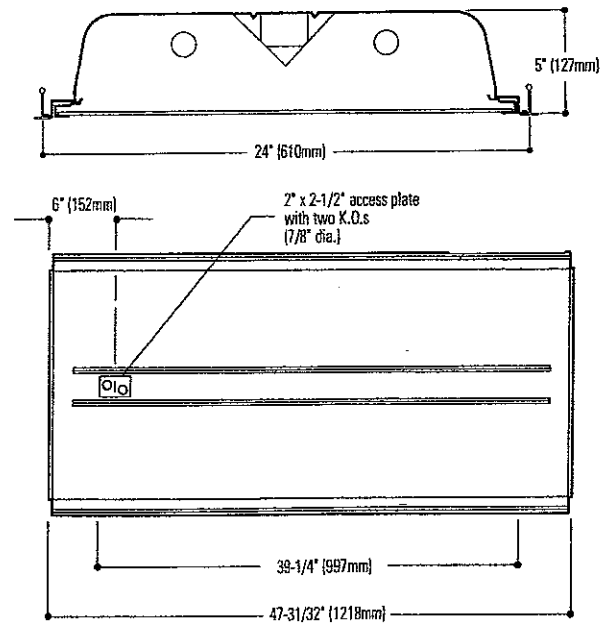
- 5" deep body.
- 3-1/16" lamp to lens for better lamp obscuration.
- 83.2% efficient.
- Clean contoured interior.
- One-piece housing has ribbed construction for added strength.
- Hemmed over side rails for maximum safety.
- Fixture ends turned-in for safe handling.
- Built-in earthquake clips (patent no. 5,072,344).
- Slimline door frame with 1000 square inch lens opening.
- Door jamb finished black on four sides for positive light stop.
- True mitered corner steel lens frame.
- Spring loaded rooster head latches.
- 18 gauge steel hinges.
- Flat and regressed aluminum doors available.



MOUNTING METHODS



DIMENSIONS



Job Information	Type: C
Job Name: CHIEF LOGAN STATE PARK	
Cat. No.: SPS2GRAVI232UNVH1	
Lamp(s):	
Volts/Ballast:	


Lightolier a Genlyte Thomas Company www.lightolier.com
 Technical Information: (978) 657-7600 • Fax (978) 658-0595
 631 Airport Road, Fall River, MA 02720 • (508) 679-8131 • Fax (508) 674-4710
 We reserve the right to change details of design, materials and finish.
 © 2002 Genlyte Thomas Group LLC (Lightolier Division)
 A0902 **Section 1A/Folio E60-30**

LIGHTOLIER®

SPECPLUS SPS2GFSVA232

2'x4' RECESSED FLUORESCENT, LENS FRAME TROFFER, STATIC, 2 LAMP, T8 OR T12

PHOTOMETRY



ifl boulder
INDEPENDENT TESTING LABORATORIES, INC. • 3364 OGDEN ROAD, BOULDER, CO 80504 USA • PHONE (303) 443-1855
FAX (303) 443-3116

REPORT NUMBER: IT149784 DATE: 03/20/00
PREPARED FOR: LIGHTOLIER
CATALOG NUMBER: SPS2GFSVA23210S0
LUMINAIRE: FABRICATED METAL HOUSING WITH WHITE PAINTED INTERIOR FINISH.
FABRICATED WHITE PAINTED METAL BALLAST COVER, CLEAR FLAT PRISMATIC PLASTIC LENS IN FABRICATED WHITE PAINTED METAL TROFFER FRAME.

LAMPS: TWO 32-WATT T-8 F32T8/SP14 LINEAR FLUORESCENTS.
BALLAST: MOTOROLA H2-RH-T8-1LL-D-120
MOUNTING: RECESSED
TOTAL REFLECTANCE OF PAINT= 90.1 %
THE 0 DEGREE PLANE IS PARALLEL WITH THE LAMPS.
TOTAL INPUT WATTS= 61.2 AT 120.0 VOLTS
LUMEN TO CANDELA RATIO USED= 9.19
REPORT IS BASED ON 2855 LUMENS PER LAMP.

CANDELA DISTRIBUTION

ANGLE	0-DEG	15-DEG	30-DEG	45-DEG	60-DEG	75-DEG	90-DEG	105-DEG	120-DEG	135-DEG	150-DEG	165-DEG	180-DEG
0	1917	1817	1817	1817	1817	1817	1817	1817	1817	1817	1817	1817	1817
15	1751	1757	1773	1790	1798	1802	1802	1802	1802	1802	1802	1802	1802
30	1513	1632	1680	1726	1748	1755	1755	1755	1755	1755	1755	1755	1755
45	1388	1423	1512	1592	1622	1622	1622	1622	1622	1622	1622	1622	1622
60	1083	1130	1220	1297	1325	1325	1325	1325	1325	1325	1325	1325	1325
75	899	937	1003	1040	1059	1059	1059	1059	1059	1059	1059	1059	1059
90	698	720	750	767	767	767	767	767	767	767	767	767	767
105	586	599	620	620	620	620	620	620	620	620	620	620	620
120	480	480	480	480	480	480	480	480	480	480	480	480	480
135	380	380	380	380	380	380	380	380	380	380	380	380	380
150	280	280	280	280	280	280	280	280	280	280	280	280	280
165	180	180	180	180	180	180	180	180	180	180	180	180	180
180	0	0	0	0	0	0	0	0	0	0	0	0	0

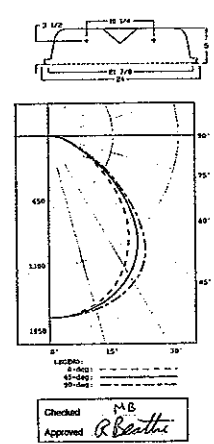
ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LAMP	%FIXT
0-30	1449	25.4	30.6
0-40	2392	42.0	50.4
0-60	4032	70.7	85.0
0-90	4743	83.2	100.0
90-180	0	0.0	0.0
0-180	4743	83.2	100.0

TOTAL LUMINAIRE EFFICIENCY = 83.2 %

CIE TYPE - DIRECT
PLANE
SPACING CRITERIA : 1.2 2.4
SHIELDING ANGLE : 90 90
PLANE : 0-DEG 90-DEG
LUMINOUS LENGTH : 46.000 21.875

LUMINANCE DATA IN CANDELA/50 M
ANGLE AVERAGE AVERAGE AVERAGE
IN DEG 0-DEG 45-DEG 90-DEG
45 2359. 2697. 2685.
55 1877. 2156. 2306.
65 1414. 1479. 1640.
75 1297. 1077. 1202.
85 1519. 1343. 1201.



Checked
Approved
R. Beattie

THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM A LABORATORY PERFORMANCE.

MODEL NO. SPS2GFSVA232

Luminaire Efficacy Rating
LER-67.4 Watts-61.2 BF-0.87

coefficients of utilization — zonal cavity method (effective floor cavity reflectance 0.20)

RC	20	20	20
FW	70	50	30
1	91	88	84
2	84	77	72
3	77	68	62
4	70	61	54
5	65	55	48
6	60	49	42
7	56	45	38
8	52	41	34
9	49	38	31
10	46	35	28

visual comfort probability (rated lumens per lamp 3150.)

room size		ceiling height				ceiling height			
W	L	8.5	10.0	13.0	16.0	8.5	10.0	13.0	16.0
20	20	71	76	82	88	71	74	79	85
20	30	66	69	75	80	67	69	72	77
20	40	62	65	70	75	65	67	69	72
20	60	59	62	66	70	63	65	67	69
30	20	73	77	81	86	72	75	79	84
30	30	66	70	73	78	68	70	72	76
30	40	62	65	69	72	65	67	68	70
30	60	58	61	64	68	62	64	65	67
30	80	56	59	61	65	61	63	63	65
40	20	75	78	82	86	74	77	80	84
40	30	68	71	74	78	69	71	73	76
40	40	63	66	69	72	66	68	69	70
40	60	59	62	64	67	63	65	65	67
40	80	57	59	60	63	61	63	63	65
40	100	56	57	58	61	60	62	62	63
60	30	69	72	75	78	70	72	74	76
60	40	64	67	69	72	66	68	69	71
60	60	59	62	63	66	63	65	65	67
60	80	57	59	60	63	61	63	63	64
60	100	55	57	57	60	59	61	61	63
100	40	67	70	71	74	69	70	71	73
100	60	62	64	65	68	65	66	67	68
100	80	59	61	61	64	62	64	64	65
100	100	57	58	58	61	60	62	62	63

ORDERING INFORMATION

Explanation of Catalog Number. Example: SPS2GFSVA232120SORF

SP	S	2	G	RA	VI	2	32	UNV	HI	
SPECPLUS: Recessed fluorescent troffer	STATIC	FIXTURE WIDTH	CEILING TYPE: G= Grid (lay-in T bar) F= Flanged (overlap) Z spline and plaster frame	LENS FRAME: FS= Flat steel frame RA= Regressed aluminum frame FA= Flat aluminum frame	LENS/SHIELDING TYPE: VA (virgin acrylic) standard (see options and consult factory)	LAMP QUANTITY	LAMP/ FIXTURE LENGTH: 32=T8 34=T12 (Nominal 48")	VOLTAGE: 120 or 277	BALLAST TYPE: LE 1-2 Lamp Mag. T12 <20THD SD* PS PS 1-2 Lamp Elec. T8 LOL T8 Dimming *Instant Start Standard	OPTIONS: Add appropriate suffix to catalog no., ie: (GLR)

Other dimming options. Consult factory.

OPTIONS & ACCESSORIES

SPECIAL LENSES: Substitute V8 for VA (standard) = .125" nominal pattern 12 with 7.8 oz. average weight per square foot. Substitute VI for VA (standard) = .125" nominal pattern 12 with 6.8 oz. average weight per square foot.

PLASTER FRAMES: Catalog Number PF24.

CONTINUOUS ROW INSTALLATION: For F type fixtures, half width flanges are required between fixtures. Order Catalog Number: SZFCRTRIM (each joint).

RADIO INTERFERENCE FILTER 120 or 277 volt, 50 or 60 Hz. One per fixture is standard. SUFFIX: RF.

FUSING: Internal fast-blow fusing. SUFFIX: GLR. Internal slow-blow fusing. SUFFIX: GMF.

ELECTRICAL/WIRING OPTIONS: Consult factory.

DRYWALL KIT: Order Catalog Number: FK92X4. Request Folio OA30-10.

CHICAGO PLENUM: SUFFIX: CP.

SPECIFICATIONS

PERFORMANCE: In an installation of 2 lamp 32W luminaires in a room cavity ratio of 1, reflectance 80% ceiling, 50% wall, 20% floor, the C.U. shall not be less than .88. To prevent glare the VCP shall be not less than 69 either lengthwise or crosswise (at 100fc level) and the average brightness at 65° shall not exceed 1640 candelas per square meter. To control veiling reflections, luminaire output in the 30°-90° zone shall not be less than 69.4%.

SPECIFICATIONS (continued)

MATERIALS: Chassis parts are die-formed code gauge cold rolled steel. Housing with side rails hemmed over and housing ends turned-in for safe handling.

FINISH: Chassis exterior—black baked polyester enamel. Cavity—white baked polyester enamel minimum 86% reflectance. Phosphate undercoating.

LENSES: VA (standard) extruded virgin acrylic, 3/16" square based female cones, running 45° to the panel edge, .095" nominal thickness (similar to pattern 12). VB (optional) .125" nominal pattern 12 with 7.8 oz. average weight per square foot. VI (optional) .125" nominal pattern 12 with 6.8 oz. average weight per square foot.

ELECTRICAL: Thermally protected class "P" ballast C.B.M. approved, non PCB. If K.O. is within 3' of ballast, use wire suitable for at least 90°.

LABELS: I.B.E.W./UL and C-UL.

Job Information	Type:	C
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A0902 **Section 1A/Folio E60-30**

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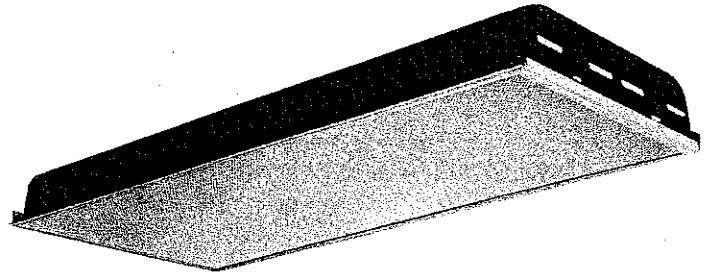
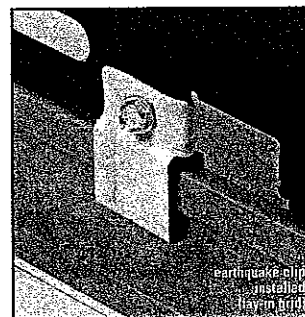
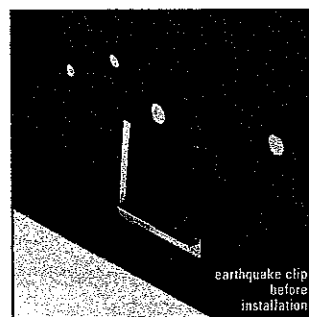
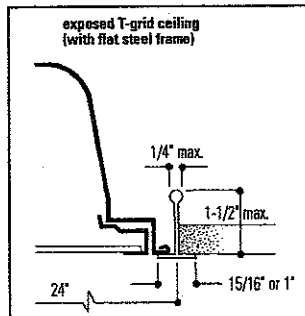
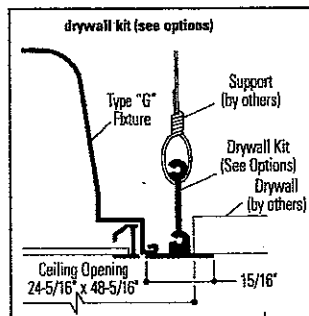
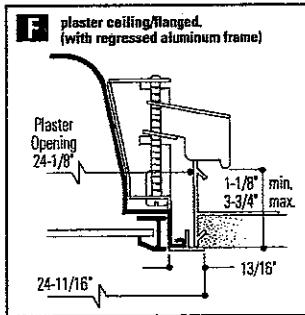
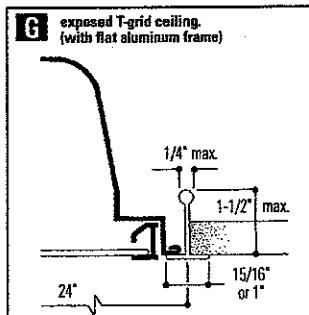
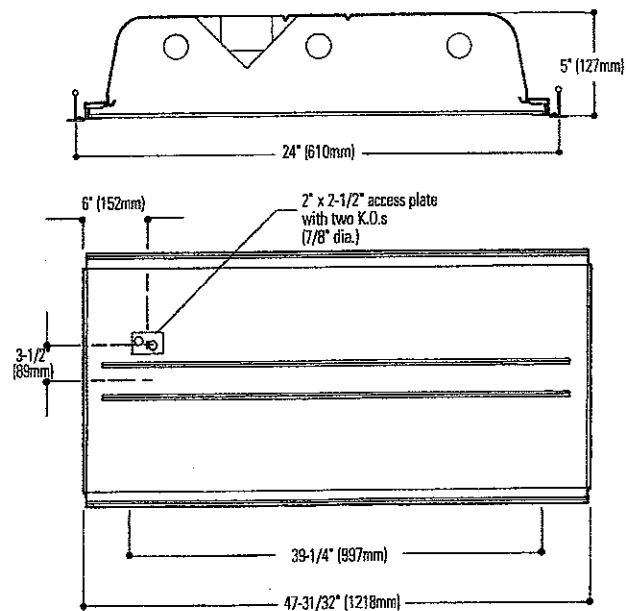
SPECPLUS **SPS2GFSVA332**

Page 1 of 2

2'x4' RECESSED FLUORESCENT, LENS FRAME TROFFER, STATIC, 3 LAMP, T8 OR T12

Features

- 5" deep body.
- 3-1/16" lamp to lens for better lamp obscuration.
- 80.1% efficient.
- Clean contoured interior.
- One-piece housing has ribbed construction for added strength.
- Hemmed over side rails for maximum safety.
- Fixture ends turned-in for safe handling.
- Built-in earthquake clips (patent no. 5,072,344).
- Slimline door frame with 1000 square inch lens opening.
- Door jamb finished black on four sides for positive light stop.
- True mitered corner steel lens frame.
- Spring loaded rooster head latches.
- 18 gauge steel hinges.
- True mitered corner steel lens frame.
- Flat and regressed aluminum doors available.

**MOUNTING METHODS****DIMENSIONS****Job Information****Type:** D**Job Name:** CHIEF LOGAN STATE PARK**Cat. No.:** SPS2GRAVI332UNVH3**Lamp(s):****Volts/Ballast:**

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A0902


Section A/Folio E60-32

LIGHTOLIER®

SPECPLUS SPS2GFSVA332

2'x4' RECESSED FLUORESCENT, LENS FRAME TROFFER, STATIC, 3 LAMP, T8 OR T12

PHOTOMETRY



INDEPENDENT TESTING LABORATORIES, INC. - 2380 LONGVIEW ROAD, BOULDER, CO 80509 USA - PHONE (303) 440-1255
 REPORT NUMBER: 17543795
 PREPARED FOR: LIGHTFOOTIER
 CATALOG NUMBER: SPS2GFSVA33212030
 DATE: 03/16/00
 LUMINAIRE: FABRICATED METAL HOUSING WITH WHITE PAINTED INTERIOR FINISH.
 FABRICATED WHITE PAINTED METAL BALLAST COVER, CLEAR PLAT PRISMATIC PLASTIC LENS IN FABRICATED WHITE PAINTED METAL HOUSING.
 LAMPS: THREE 32-WATT 2-8 F32T8/SP41 LINEAR FLUORESCENTS.
 BALLAST: MOTOROLA M3-RN-78-1LL-120
 MOUNTING: RECESSED
 TOTAL REFLECTANCE OF PAINT: 92.5 %
 THE 0 DEGREE PLANE IS PARALLEL WITH THE LAMPS.
 TOTAL INPUT WATTS: 84.4 AT 120.0 VOLTS
 LUMEN TO CANDELA RATIO USED: 9.19
 REPORT IS BASED ON 2856 LUMENS PER LAMP.

CANDELA DISTRIBUTION

ANGLE	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0	202.5	225.0	247.5	270.0	292.5	315.0	337.5	360.0	382.5	405.0	427.5

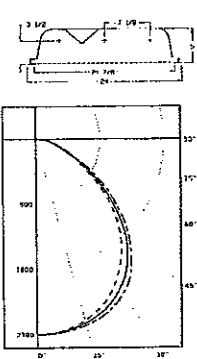
ZONAL LUMEN DISTRIBUTION

ZONE	0-30	30-40	40-60	60-90
LUMENS	2139	3504	5832	6848
LAMP	25.0	41.0	68.2	80.1
POINT	51.2	51.2	85.2	100.0

TOTAL LUMINAIRE EFFICIENCY = 80.1 %

CIE TYPE - DIRECT
 PLANE: 0-DEG 90-DEG
 SPACING CRITERIA: 1.2 1.3
 SHIELDING ANGLE: 30 30
 PLANE: 0-DEG 90-DEG
 LUMINOUS LENGTH: 46.000 21.875

LUMINANCE DATA IN CANDELA/SQ M
 ANGLE AVERAGE AVERAGE AVERAGE
 IN DEG 0-DEG 45-DEG 90-DEG
 25 3504. 3774. 3950.
 55 2776. 3007. 3267.
 65 2080. 2077. 2289.
 75 1896. 1547. 1743.
 85 2226. 1908. 1731.



Checked: *R. Beattie*
 Approved: *R. Beattie*

THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE.

MODEL NO. SPS2GFSVA332

Luminaire Efficacy Rating
 LER-70.6 Watts-84.4 BF-0.87

coefficients of utilization — zonal cavity method (effective floor cavity reflectance 0.20)

RC	20			50			80		
	70	50	30	50	30	10	50	30	10
1	88	84	81	79	77	75	76	74	72
2	81	74	69	70	66	63	67	64	61
3	74	66	60	62	58	54	60	56	53
4	68	59	52	56	50	46	54	49	46
5	63	53	46	50	45	40	49	44	40
6	58	48	41	46	40	36	44	39	35
7	54	44	37	42	36	32	41	35	31
8	50	40	33	38	33	28	37	32	28
9	47	37	30	35	30	26	34	29	26
10	44	34	28	33	27	23	32	27	23

visual comfort probability (rated lumens per lamp 3150.)

W	L	ceiling height				ceiling height			
		8.5	10.0	13.0	16.0	8.5	10.0	13.0	16.0
20	20	64	68	75	82	64	67	73	80
20	30	57	61	67	73	59	62	65	70
20	40	53	57	62	67	57	59	61	65
20	60	49	53	57	62	54	56	58	61
30	20	66	70	75	81	66	69	73	79
30	30	58	62	66	71	60	62	65	69
30	40	53	56	60	64	57	59	60	63
30	60	48	52	55	59	54	56	57	59
30	80	47	50	51	55	52	54	55	57
40	20	68	71	76	80	67	70	74	79
40	30	60	63	67	71	61	64	66	69
40	40	54	57	60	64	58	60	61	63
40	60	50	53	55	58	54	56	57	59
40	80	47	50	51	54	52	54	55	56
40	100	46	48	49	52	51	53	53	55
60	30	61	65	67	71	62	65	66	70
60	40	56	59	61	64	58	60	61	64
60	60	50	53	55	58	54	56	57	59
60	80	47	50	50	54	52	54	54	56
60	100	46	48	48	51	51	52	52	54
100	40	59	62	64	67	60	62	63	66
100	60	53	56	57	60	56	58	58	61
100	80	50	52	52	55	54	55	55	57
100	100	48	49	49	52	52	53	53	54

ORDERING INFORMATION

Explanation of Catalog Number. Example: SPS2GFSVA33212003RF

SP SPECPLUS: Recessed fluorescent troffer	S STATIC	2 FIXTURE WIDTH	G CEILING TYPE: G-Grid (lay-in T bar) F-Flanged (overlap) Z spine and plaster frame	RA LENS FRAME: FS-Flat steel frame RA-Regressed aluminum frame FA-Flat aluminum frame	VI LENS/SHIELDING TYPE: VA (virgin acrylic) standard (see options and consult factory)	3 LAMP QUANTITY	32 LAMP/ FIXTURE LENGTH: 32-T8 34-T12 (Nominal 48")	UNV VOLTAGE: 120 or 277	H3 BALLAST TYPE: LE 1 & 2 Lamp Mag. T12 1 & 2 Lamp Elec. T8 1-3 Lamp Elec. T8 LOL T8 Dimming *Instant Start Standard Other dimming options. Consult factory.	OPTIONS: Add appropriate suf- fix to catalog no., ie: (GLR) LE <20THD S0* O3* PS HI* H3* -
--------------------------------------------------------------	--------------------	------------------------------	--------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------	------------------------------	---------------------------------------------------------------------------	--------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------

OPTIONS & ACCESSORIES

SPECIAL LENSES: Substitute VB for VA (standard) = .125" nominal pattern 12 with 7.8 oz. average weight per square foot. Substitute VI for VA (standard) = .125" nominal pattern 12 with 6.8 oz. average weight per square foot.

PLASTER FRAME: Catalog Number PF24.

CONTINUOUS ROW INSTALLATION: For F type fixtures, half width flanges are required between fixtures. Order Catalog Number: S2CFTRIM (each joint).

RADIO INTERFERENCE FILTER 120 or 277 volt, 50 or 60 Hz. One per fixture is standard.

SUFFIX: RF.

FUSING: Internal fast-blow fusing.
 SUFFIX: GLR.
 Internal slow-blow fusing.
 SUFFIX: GMF.

ELECTRICAL/WIRING OPTIONS: Consult factory.

DRYWALL KIT: Order Catalog Number: FK92X4.
 Request Folio OA30-10.

CHICAGO PLENUM: SUFFIX: CP.

SPECIFICATIONS

PERFORMANCE: In an installation of 3 lamp 32W luminaires in a room cavity ratio of 1, reflectance 80% ceiling, 50% wall, 20% floor, the C.U. shall not be less than .84. To prevent glare the VCP shall be not less than 50 either lengthwise or crosswise (at 100fc level), and the average brightness at 65° shall not exceed 2299 candelas per square meter. To control veiling reflections, luminaire output in the 30°-90° zone shall not be less than 68.8%.

SPECIFICATIONS (continued)

MATERIALS: Chassis parts are die-formed code gauge cold rolled steel. Housing with side rails hemmed over and housing ends turned-in for safe handling.

FINISH: Chassis exterior—black baked polyester enamel. Cavity—white baked polyester enamel minimum 86% reflectance. Phosphate undercoating.

LENSES: VA (standard) extruded virgin acrylic, 3/16" square based female cones, running 45° to the panel edge, .095" nominal thickness (similar to pattern 12). VB (optional). 125" nominal pattern 12 with 7.8 oz. average weight per square foot. VI (optional). 125" nominal pattern 12 with 6.8 oz. average weight per square foot.

ELECTRICAL: Thermally protected class "P" ballast C.B.M. approved, non PCB. If K.O. is within 3" of ballast, use wire suitable for at least 90°.

LABELS: I.B.E.W./UL and ULc Listed.

Job Information	Type:	D
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 A902 **Section 1A/Folio E60-32**

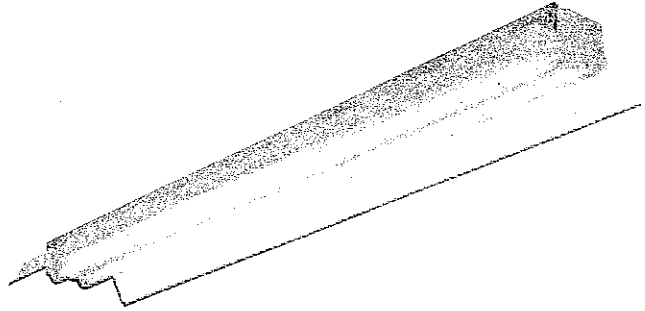
LIGHTOLIER®

KW Industrial Fluorescent KW SERIES

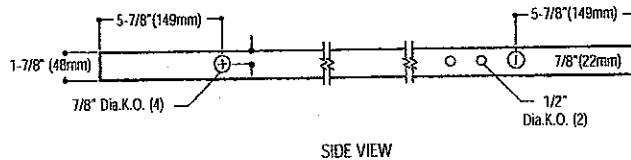
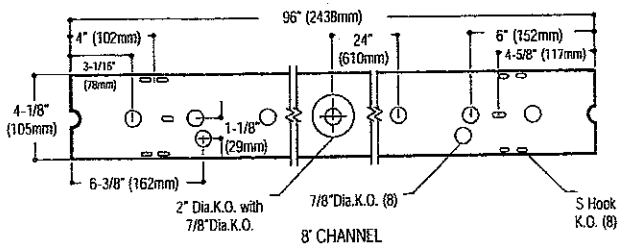
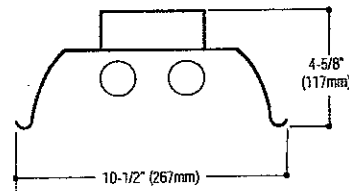
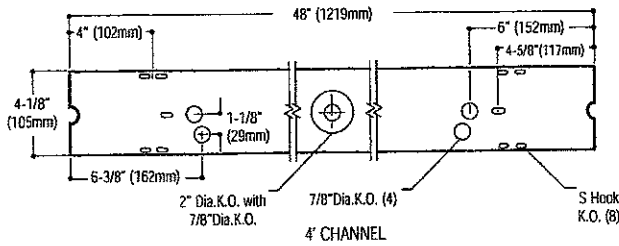
4-1/8" Wide x 48" or 96" Lengths, Solid Top, 2 Lamp T8 or T12

Features

- Reflectors are embossed for rigidity.
- Reflector sides are turned up for rigidity and safe handling.
- Solid top reflector, standard.
- 10% aperture reflector, optional.
- Reflectors easily installed with quarter turn fasteners. No tools required.
- 4-1/8" wide heavy duty channel of code gauge die-formed steel.
- Combination end cap/coupler requires no tools for installation.
- Suitable for individual or row mounting.
- Fully enclosed wiring.
- Multiple knockouts for convenient installation.
- Optional hangers, wire guards and aligners.
- Optional heavy duty coupling.



Dimensions



Job Information	Type:	F
Job Name: CHIEF LOGAN STATE PARK		
Cat. No.: KW4S232UNVH1		
Lamp(s):		
Volts/Ballast:		

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Photometry
Report No: G42321
Catalog No:
KW4S232120SO
Lamp Type: 2F32T8
Lumens Per Lamp: 2900
Total Efficiency: 86.6%
CIE Type: Direct
Spacing Criteria: 1.5
Shielding Angle: 180

Model No. KW4S232120SO

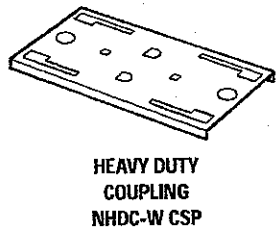
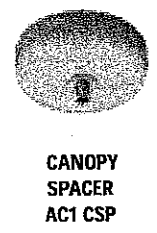
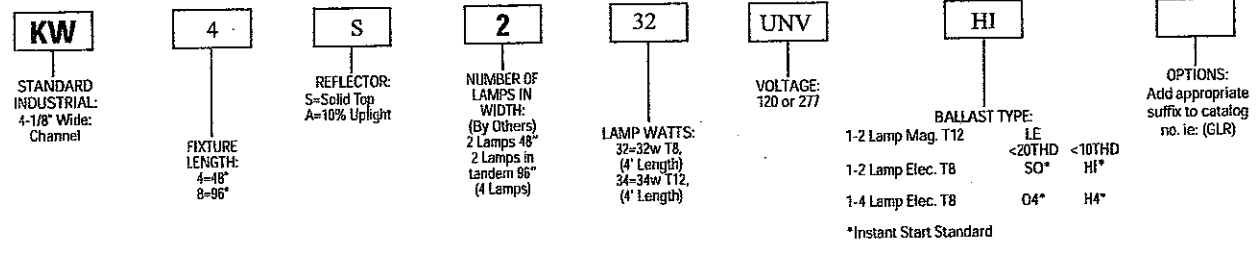
LER = F1 - 76.5 IW - 58 BF - 0.88
Comparative yearly lighting energy cost per 1000 lumens = \$3.14

coefficients of utilization- zonal cavity method

RF	20			50			30			
RC	80			80			30			
RW	70	50	30	50	30	10	50	30	10	
room cavity method	1	93	88	84	81	78	76	78	75	73
	2	83	76	69	70	65	61	67	63	59
	3	75	65	58	61	55	50	58	53	48
	4	68	57	49	53	47	42	51	45	41
	5	63	51	42	47	41	35	45	39	35
	6	58	45	37	42	36	31	41	35	30
	7	53	41	33	38	32	27	37	31	26
	8	49	37	29	35	28	24	34	28	23
	9	46	34	27	32	26	21	31	25	21
	10	43	31	24	30	23	19	29	23	19

Ordering Information

Explanation of Catalog Number. Example: KW4S232120SOGLR



Options & Accessories

- Fusing:** Internal fast-blow fusing. Suffix: **GLR**. Internal slow-blow fusing. Suffix: **GMF**.
- Fluorescent Emergency Lighting System:** Factory-installed emergency power battery pack with charger and inverter. Suffix: **EM**.
- Stem and Canopy Sets:** Suspends fixtures 6", 12", 18" or 24" from surface. Catalog Number: **ASC6 CSP (6")**, **ASC12 CSP (12")**, **ASC18 CSP (18")**, **ASC24 CSP (24")**.
- Canopy Spacer:** Suspends fixture 1-1/2" from surface. Catalog Number: **AC1 CSP**.
- 4' Wire Guard (White):** Specify two for 96" fixtures. Catalog Number: **AWG4W CSP**.
- Reflector Row Aligners:** Two aligners are included with all 96" fixtures. For continuous row installations, specify two additional bulk-packed aligners per reflector joint. Catalog Number: **KNA**.
- Chain Hanging Kit:** Includes two 5' heavy duty link chains with sturdy "V" hooks for fixture suspension. Catalog Number: **AH5 CSP**.
- Twist Tee:** For exposed T-bar mounting, 1-7/8" deep channel. Catalog Number: **NAH3 CSP**.
- Heavy Duty Coupler:** Catalog Number: **NHDC-W CSP**.

Specifications

Materials: Chassis parts are die-formed heavy gauge cold rolled steel, 4-1/8" channel width.

Specifications (continued)

- Reflector:** Heavy duty die-formed with deep lateral embossments and return edges for additional stability and uniformity and two quick release quarter turn fasteners for attachment to housing.
- Ballast Cover:** Code gauge steel secured with quarter turn latch.
- Finish:** Chassis exterior—phosphate undercoating, baked white polyester enamel.
- Electrical:** Thermally protected class "P" ballast C.B.M. approved, non PCB. If K.O. is within 3" of ballast, use wire suitable for at least 90°.
- Labels:** I.B.E.W./UL and C-UL.

Job Information	Type:	F
------------------------	--------------	----------

Lightolier a Genlyte Thomas Company www.lightolier.com
Technical Information: (978) 657-7600 • Fax (978) 658-0595
631 Airport Road, Fall River, MA 02720 • (508) 679-8131 • Fax (508) 674-4710
We reserve the right to change details of design, materials and finish.
Copyright 2002 Lightolier **Section 7/Folio Q70-40**

LIGHTOLIER®

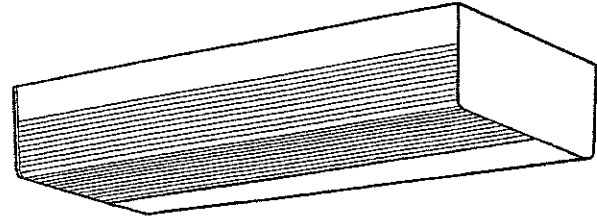
Universal Wall **LWBU Series**

Page 1 of 2

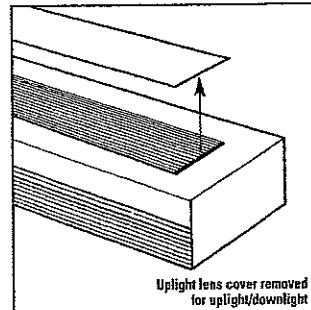
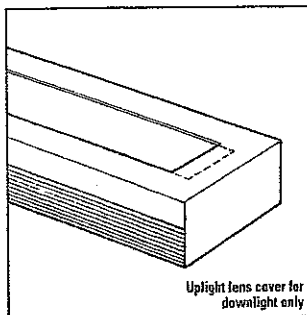
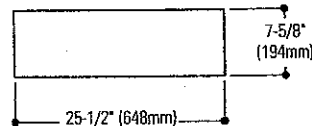
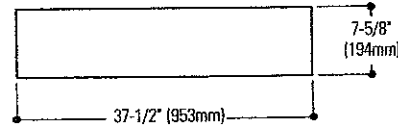
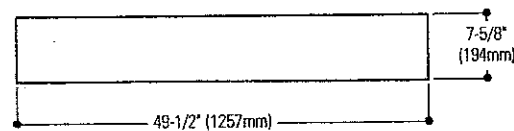
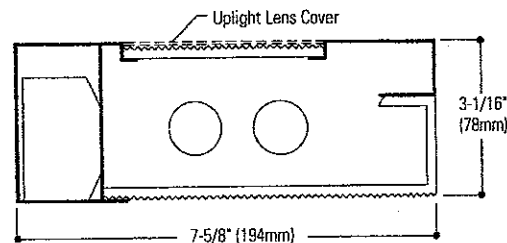
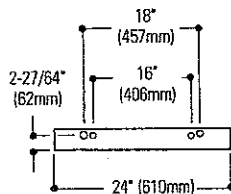
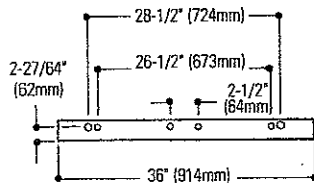
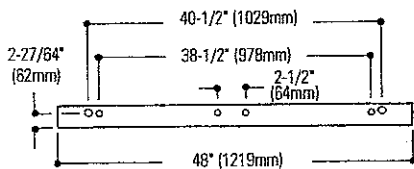
Wall Mounted Fluorescent, 7-5/8" Width, 24", 36", 48" Lengths
Uplight/Downlight or Downlight Only, 1 or 2 Lamp T8

Features

- Universal luminaire that has uplight/downlight or downlight only capabilities on the same fixture
- Low brightness controlled uplighting/downlighting
- Low brightness linear prismatic virgin acrylic refractor
- Slim 3-1/16" depth
- Nominal 2', 3' and 4' lengths
- 65.2% efficient (T8 lamps, uplight/downlight)
- 62.4% efficient (T8 lamps, downlight only)
- Invisible steel latches align refractor to housing
- Individual or continuous rows
- For over mirror, over bed, corridor, stairwell and bulletin board applications



Dimensions



Job Information

Type:

G

Job Name: CHIEF LOGAN STATE PARK

Cat. No.: LWBU232UNVH1

Lamp(s):

Volts/Ballast:

Lightolier a Genlyte Thomas Company

www.lightolier.com

Technical Information: (978) 657-7600 • Fax (978) 658-0595

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Section 4A/Folio I20-18

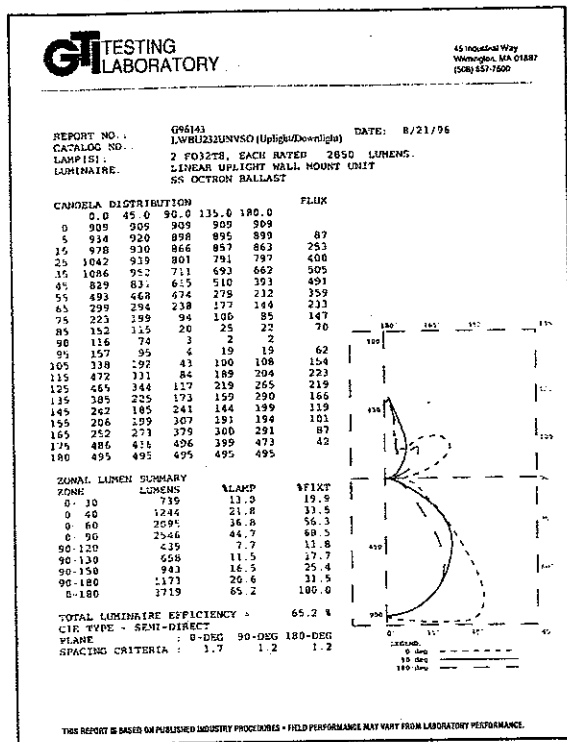
LIGHTOLIER®

Universal Wall **LWBU Series**

Wall Mounted Fluorescent, 7-5/8" Width, 24", 36", 48" Lengths
Uplight/Downlight or Downlight Only, 1 or 2 Lamp T8

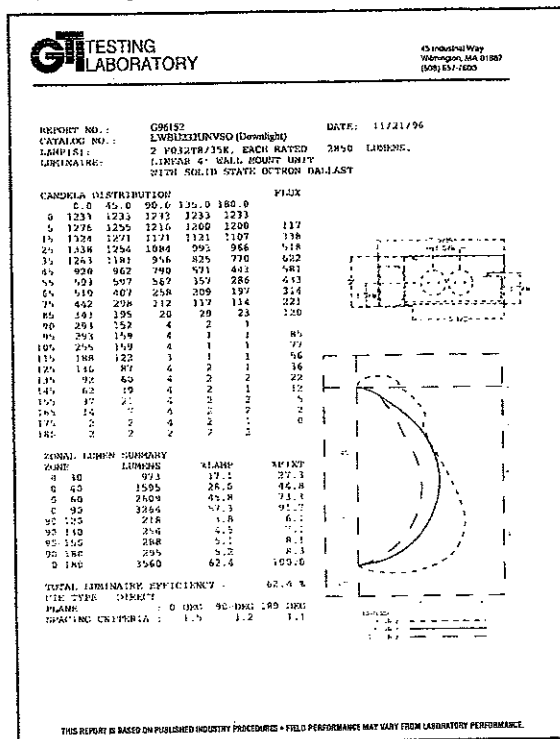
Photometry

Model No. LWBU232UNVSD (Uplight/Downlight)



Photometry

Model No. LWBU232UNVSD (Downlight)



Ordering Information

Explanation of Catalog Number: Example: LWBU232UNVSD0EM

LWBU

LWBU Universal Wall Mounted White Body Fluorescent Uplight/Downlight or Downlight Only

2

Lamp Quantity:
1 = 1 Lamp
2 = 2 Lamp

32

Lamp Fixture Length:
17=T8, 2' Length
25=T8, 3' Length
32=T8, 4' Length

UNV

Voltage:
120 or 277
UNV: Universal Voltage 120-277

HI

Ballast Type:
<20THD <10THD
1 & 2 Lamp Elec. (T8) SO* HI*
LOL T8 Dimming PS -
*Instant Start Standard
Other dimming options. Consult factory.

Options:

Add appropriate suffix to catalog no. (e: IEM)

Options/Accessories

Fusing: Internal fast-blow fusing. Suffix: **GLR**.

Internal slow-blow fusing. Suffix: **GMF**.

Radio Interference Filter: 120 or 277 volt, 50 or 60 Hz. One per fixture:

Suffix: **R**. One per ballast. Suffix: **B**.

Emergency Power Pack: Factory installed emergency power pack includes charger and inverter concealed in fixture channel. Upon loss of AC power, operates one lamp at reduce light. Suffix: **EM**.

Electrical Wiring Options: Consult factory.

Note: Consult factory for availability of options for nominal 2' long fixtures.

Specifications

Materials: Chassis parts are die-formed code gauge cold rolled steel.

Refractor—one-piece virgin acrylic.

Finish: Chassis exterior—white baked acrylic enamel. **Cavity**—white baked acrylic enamel minimum 88% reflectance. Phosphate undercoating.

Refractor (downlight): One-piece injection-molded, (full re-entrant virgin acrylic with Catadioptric side, ends and wall design with diamond shape square base male conical prisms on horizontal surface.

Specifications (continued)

Electrical: Thermally protected class "P" ballast C.B.M. approved, non PCB. If K.O. is within 3" of ballast, use wire suitable for at least 90°.

Labels: I.B.E./UL and ULc Listed.

Job Information

Type:

G

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Technical Information: (978) 657-7600 • Fax (978) 658-0595
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LIGHTOLIER®

Type No. H
 Catalog No. PVNO224BS2YW
 Job. Name CHIEF LOGAN STATE PARK

ProTector™ V Series

2-Foot Linear Fluorescent Vandal-Resistant Lighting Fixture

APPLICATIONS

- Ideal for high-traffic areas requiring architectural surface-mounted luminaires that withstand intentional vandalism

CONSTRUCTION

- Marine-grade, extruded aluminum housing
- Tamper-resistant stainless steel hardware
- Architectural die-cast end caps
- Polyester powder, semi-gloss textured finish
- Fade-resistant color (custom colors available – consult factory)
- Standard color is white

ELECTRICAL

- High-Efficiency T5, T5HO and T8 lamping
- Exceptionally high fixture efficiency
- 91.7% maintained lumens
- Extremely high CRI of 85
- Immediate hot re-strike
- Greater uniformity
- No color shift
- Instant-on

OPTICS

- 2', 4' and 8' sizes in T5, T5HO or T8 configurations
- Extruded impact-resistant polycarbonate lens
- Delivers uniform illumination without glare
- Available in clear prismatic and opal prismatic

MOUNTING

- Available direct from factory
- No field drilling required

WARRANTY/LISTINGS

- "LifeLyte" limited lifetime warranty
- UL/CUL listed for wet locations

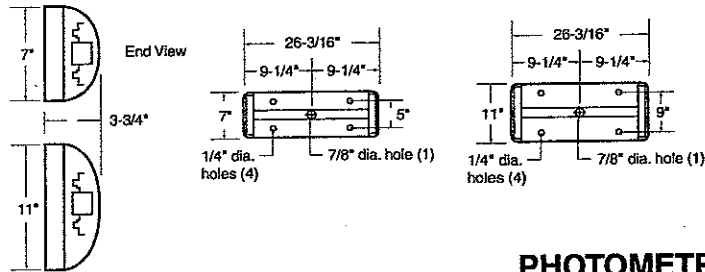


11" Wide Model



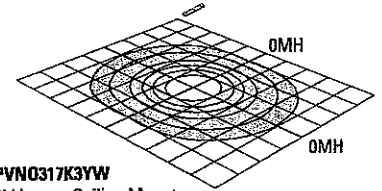
7" Narrow Model

DIMENSIONAL DATA



PHOTOMETRIC DATA

Mounting Height = 8 ft.
 Gridscale = 8 ft. per increment



PVNO317K3YW
 2' Linear - Ceiling Mount
 3-17w T8 fluorescent

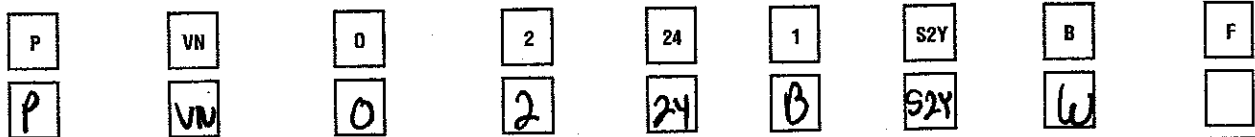
Horizontal Footcandles
 Lumen/Lamp = 2,850
 Light Loss Factor = 1.00

1 FT-C	2 FT-C	5 FT-C	1 FT-C	2 FT-C	5 FT-C
--------	--------	--------	--------	--------	--------

BALLAST MATRIX

# Lamps	Wattage	Source	Ballast
2	14w	T5	N2Y
	17w	T8	K2Y
	24w	T5HO	S2Y
3	14w	T5	N6Y
	17w	T8	K3Y
	24w	T5HO	S6Y
4	14w	T5	N8Y
	17w	T8	K4Y
	24w	T5HO	S8Y

Ordering Guide Example: PVNO2241S2YBF



Series	Style	Lens	Lamp #	Watts	Volts	Ballast	Color*	Options
--------	-------	------	--------	-------	-------	---------	--------	---------

P=ProTector
 Linear

VN=Narrow (7")
 VW=Wide (11")

O=Opal Poly
 C=Clear Poly

2
 (7" Narrow)
 3
 (11" Wide)
 4
 (11" Wide)

14 (T5)
 17 (T8)
 24 (T5HO)

1=120v
 7=277v
 B=Univ

See Ballast Matrix
 Above

B=Black
 W=White
 P=Bronze

2C=2 Circuit
 3C=3 Circuit
 F=Fused
 PC=Photo Control
 Battery Back-Up
 Consult Factory
 for Availability

* Custom colors available. Consult factory.



Type No. J

Catalog No. 553400MAL/8

Job Name CHIEF LOGAN STATE PARK

500 Wallcube Series

General Purpose Large Wallpack

APPLICATIONS

- Security, Accent, Perimeter, Entrance Ways, Garage Doors, Indoor Parking Garages, Tunnels, Overpasses, Alleys.

CONSTRUCTION

- Precision die-cast aluminum housing.
- Corrosion resistant Duraplex II Bronze polyester powder coated finish.
- Optional designer finishes available. See inside back cover of ExceLine catalog.

ELECTRICAL

- Porcelain spring-loaded 4KV pulse rated socket-mogul base.
- HPF CWA ballast Constant Wattage Autotransformer.
- Starting temperature: LX(HPS)-40° F/-40° C, MA(MH)-20° F/-30° C.
- **Pulse Start compatible.** See chart in the Energy Saving Products section.

OPTICS

- Heat and shock resistant, borosilicate glass refractor.
- One-piece "wrap-around" shape for maximum light utilization.
- Specular anodized aluminum reflector.

MOUNTING

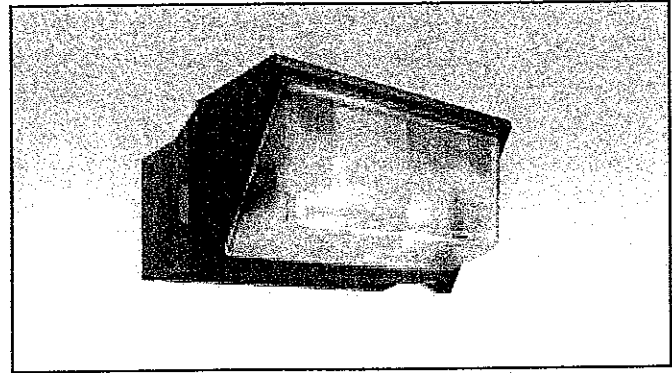
- One tapped hole on each side and top (1/2" NPS standard) for conduit or optional photocontrol.

WARRANTY/LISTINGS

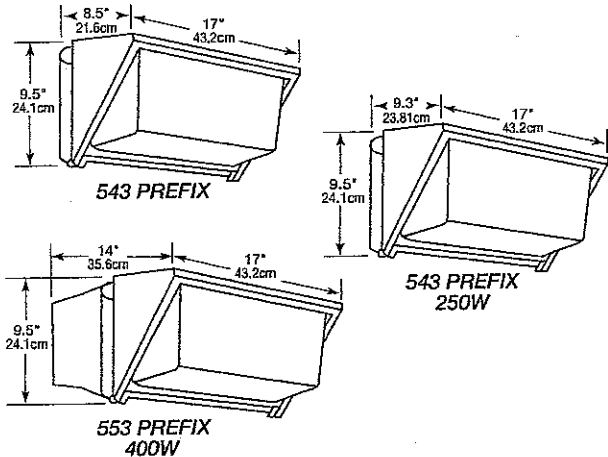
- UL 1598 listed for wet locations.
- Published five year limited warranty.

OPTIONS & ACCESSORIES — SEE END OF THIS SECTION.

PHOTOMETRICS — SEE REVERSE SIDE.



250 and 400 Watt (MA) Metal Halide and (LX) High Pressure Sodium
35 Watt (SX) Low Pressure Sodium
500 Watt (IN) Incandescent



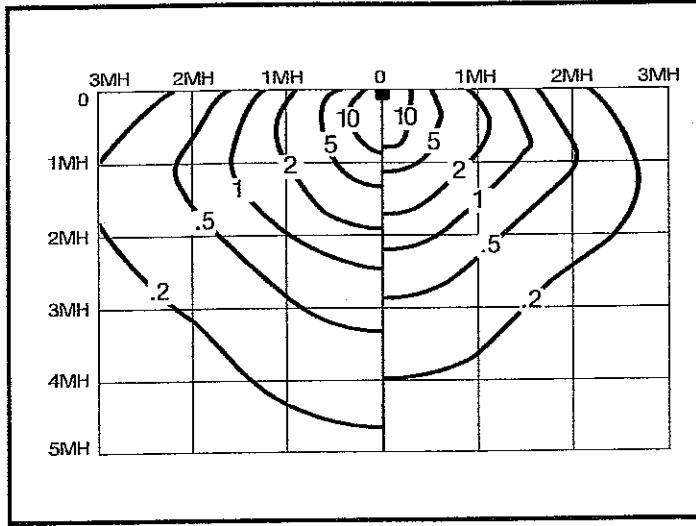
ORDERING GUIDE EXAMPLE: 543250MA-5

5	4	3	250	MA	-	5
5	5	3	400	MA	-	8
Prefix	Back Box	Distribution	Wattage	Source	Options	Voltage
5	4=Shallow	3	250=250(E/BT28)	MA	See options/acc's end of this section.	5= 480
			250=250(E18/28)	LX		8=120-277
			351= 35(T17)	SX		
			500=500(PS40)	IN		
	5=Deep		400=400(E/BT37)	MA		
			400=400(E18/37)	LX		

Product information is subject to change without notice.



500 Wallcube Series



553250LX
 LU250
 27,500 Lumens
 15' Mount. Hgt.

543250MA
 MH250/J
 20,500 Lumens
 15' Mount. Hgt.

Type No. K

Catalog No. 61342HFL/6/EM

Job Name CHIEF LOGAN STATE PARK

600 Series

Architectural Wall-Mount Cut-off

APPLICATIONS

- Security, access and perimeter lighting for institutional and commercial applications.

CONSTRUCTION

- Die-cast heavy-gauge aluminum housing for superior corrosion resistance.
- Non-yellowing tempered glass flat lens with a weather-tight silicone gasket.

ELECTRICAL

- Tray-mounted ballast with integral heat sink for maximum heat dissipation.
- Deluxe glazed porcelain socket pulse rated for 4KV.
- 57 watt to 175 watt capacity.

OPTICS

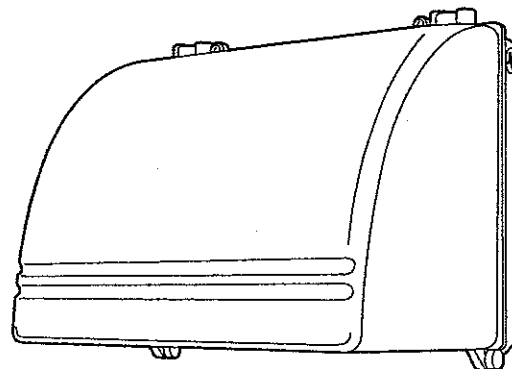
- Lamp types include Metal Halide, Pulse Start Metal Halide, High Pressure Sodium and Compact Fluorescent.
- HID lamp types are medium base.
- Cut-Off optics.
- Die-formed specular reflector.

MOUNTING

- Direct mounts to wall or other vertical surfaces.

WARRANTY/LISTINGS

- UL1598 listed for damp locations.
- Published 5-year warranty.



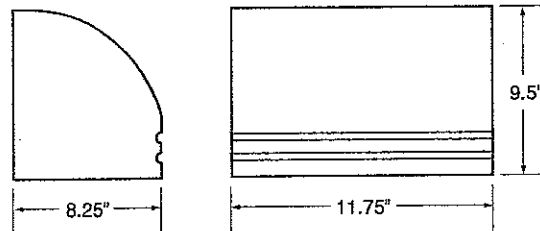
OPTIONS

- Colors: - Dark Bronze comes standard.
 - Consult local agent for available colors.

ACCESSORIES

- 630 Wire Guard
- P110A External Pencil Photo Control 120v
- P150F External Photo Control 120v - 277v
- 600L Field-installed latches for tool-less entry

DIMENSIONS



Ordering Guide Example: 613175MAL- 8

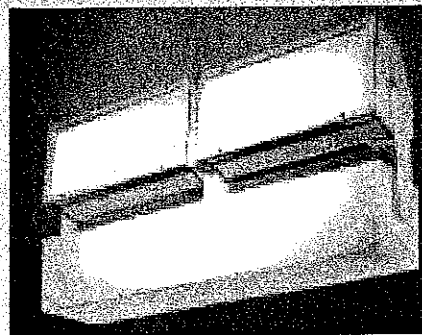
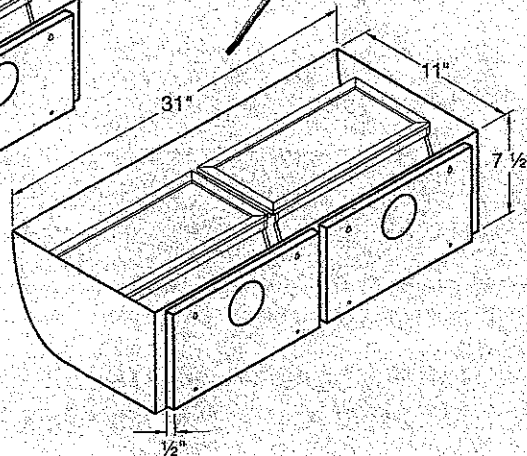
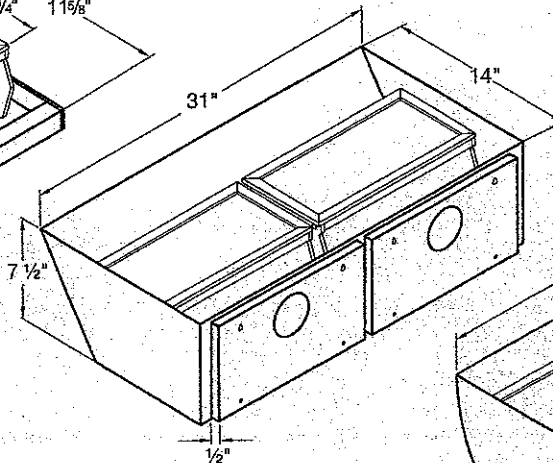
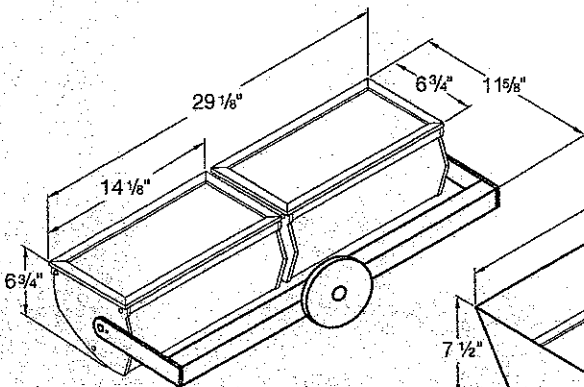
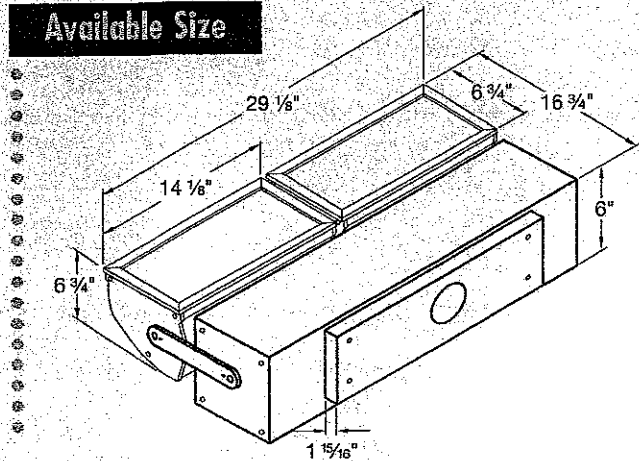
6	1	3	175	MA	L	EM	8
6	1	3	42	HF	L		6

Prefix	Lamp Base	Distribution	Wattage	Lamp Source	Options	Voltage
6	1=Medium	3=Type III	57=57W 70=70W 100=100W 150=150W	MA=Metal Halide (175w) PMA= Pulse Start (70w-150w) LX=High Pressure Sodium (35w-150w) NLX=High Pressure Sodium (35w-150w)	L=Lamp	1=120 volt 5= 480 volt 6=120/277 volt 8=120-277 volt

42: 42W 40T



Available Size



Type L
 QUA-400MH-1-
 AS-277-WH-
 SBS-PERF

NOT APPROVED

How To Specify

Indicates Quasar/Projector Series

Light Source:
 MH = Metal Halide
 HQI = Double Ended Metal Halide
 PS = Pulse Start

Type of Ballast:
 1 = Remote
 2 = Internal

Voltage:
 120V or 277V

White (Standard)
 Custom Finishes available

QUA - 400MH - 1 - AS - 120 - FINISH - OPTION

Indicates Mounting:
 AS = Angle Shroud
 RS = Radius Shroud
 WM = Wall Mount

Indicates Wattage:
 70W (med. base ED-17)
 70W HQI (R7S base T-6)
 100W (med. base ED-17)
 150W HQI (R7S base T-7)
 175W (med. base ED-17)
 250W (mogul base T-15)
 400W (mogul base T-15)

Pulse Start:
 175W (med. base ED-17)
 250W (med. base ED-28)
 350W (med. base ED-28)

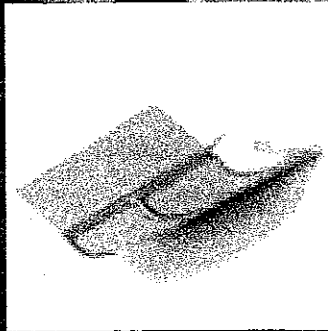
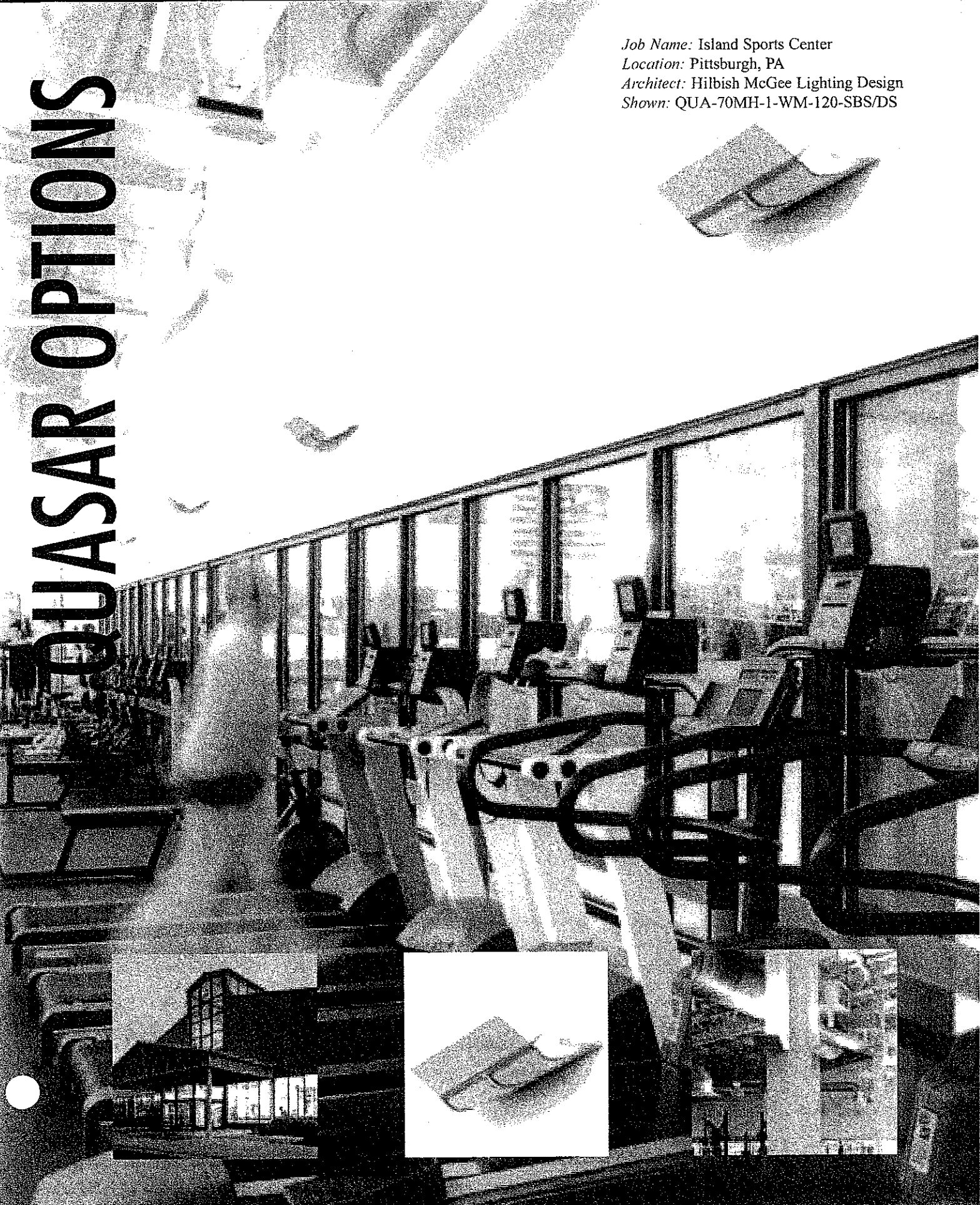
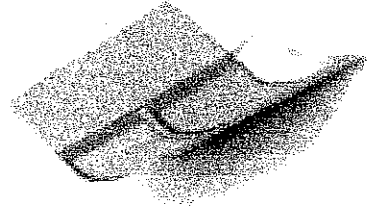
Other lamp sources available. Consult factory.

SBS = Side by Side Housing
 EM-Q = Incandescent (DC Bayonet) Stand-By Light 120V Only - 250W Max.
 RBT = Remote Ballast Tray
 DS = Deflector Shield
 ASY = Asymmetric Reflector
 WL = With Lamp

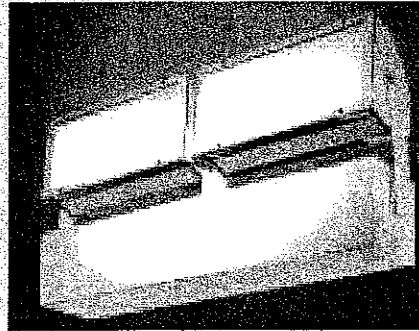
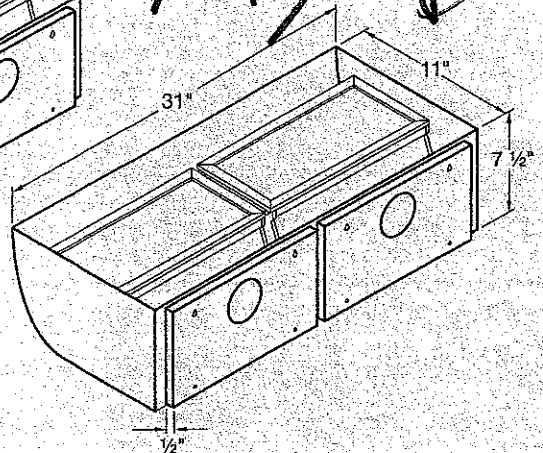
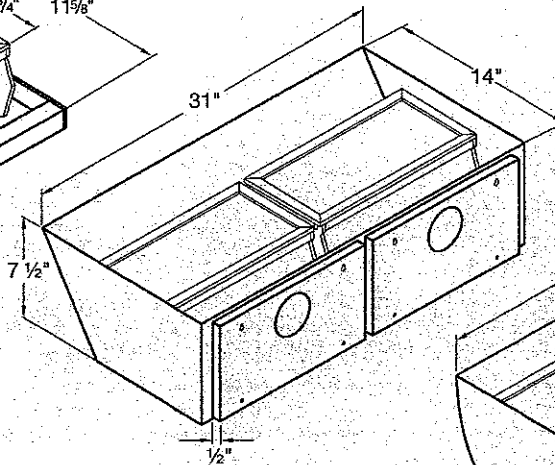
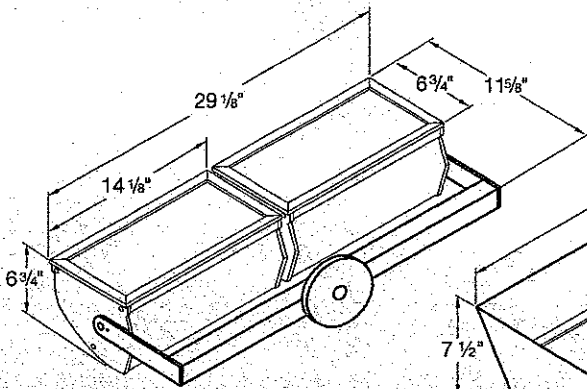
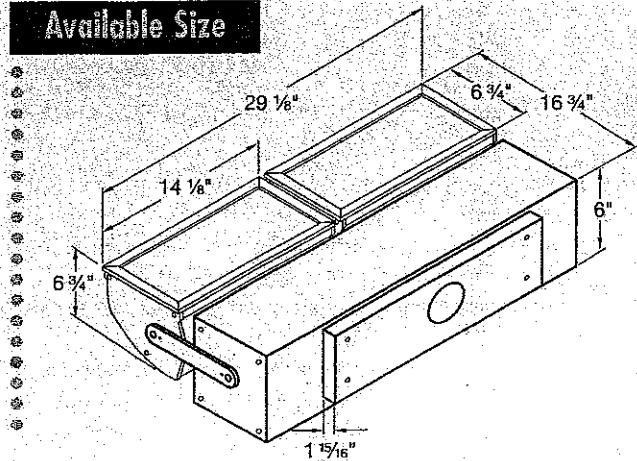


QUASAR OPTIONS

Job Name: Island Sports Center
Location: Pittsburgh, PA
Architect: Hilbish McGee Lighting Design
Shown: QUA-70MH-1-WM-120-SBS/DS



Available Size



Type L1
 QUA-400MH-1-
 AS-277-WL-
 SBS-PERF-
 QRS

NOT APPROVED
RS

How To Specify

Indicates Quasar/Projector Series

Light Source:
 MH = Metal Halide
 HQI = Double Ended Metal Halide
 PS = Pulse Start

Type of Ballast:
 1 = Remote
 2 = Internal

Voltage:
 120V or 277V

White (Standard)
 Custom Finishes available

QUA - 400MH - 1 - AS - 120 - FINISH - OPTION

Indicates Mounting:
 AS = Angle Shroud
 RS = Radius Shroud
 WM = Wall Mount

Indicates Wattage:
 70W (med. base ED-17)
 70W HQI (R7S base T-6)
 100W (med. base ED-17)
 150W HQI (R7S base T-7)
 175W (med. base ED-17)
 250W (mogul base T-15)
 400W (mogul base T-15)

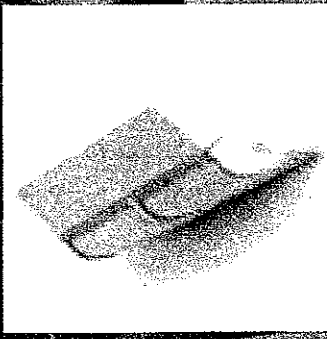
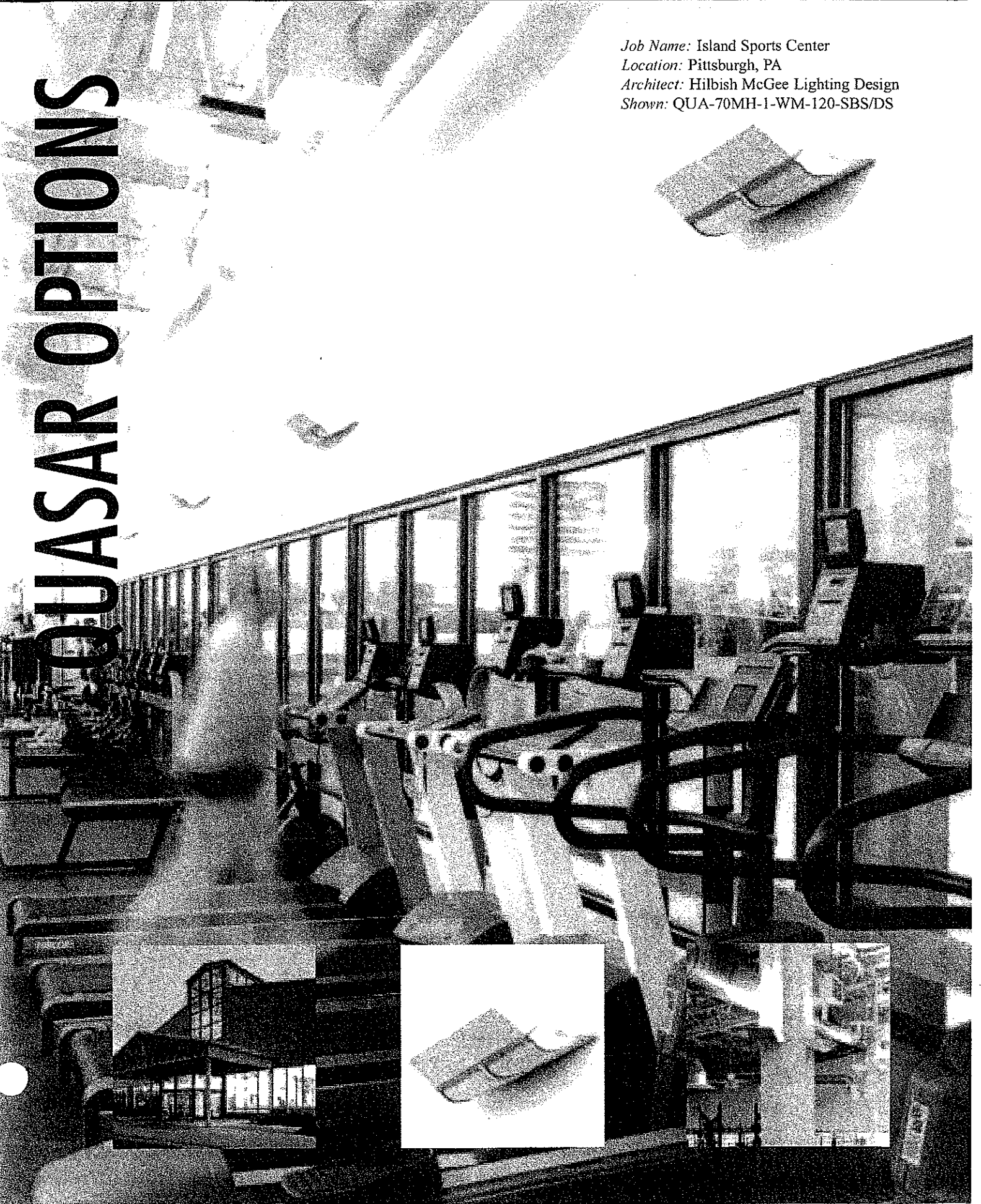
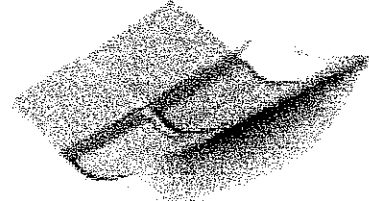
Pulse Start:
 175W (med. base ED-17)
 250W (med. base ED-28)
 350W (med. base ED-28)
 Other lamp sources available. Consult factory.

SBS = Side by Side Housing
 EM-Q = Incandescent (DC Bayonet) Stand-By Light 120V Only - 250W Max.
 RBT = Remote Ballast Tray
 DS = Deflector Shield
 ASY = Asymmetric Reflector
 WL = With Lamp



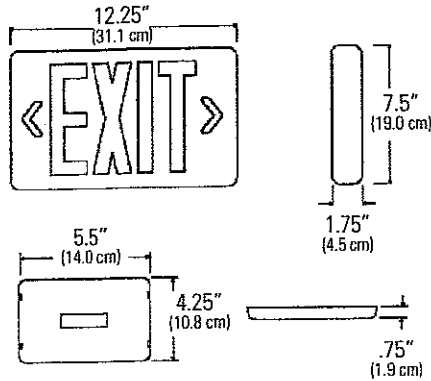
QUASAR OPTIONS

Job Name: Island Sports Center
Location: Pittsburgh, PA
Architect: Hilbish McGee Lighting Design
Shown: QUA-70MH-1-WM-120-SBS/DS

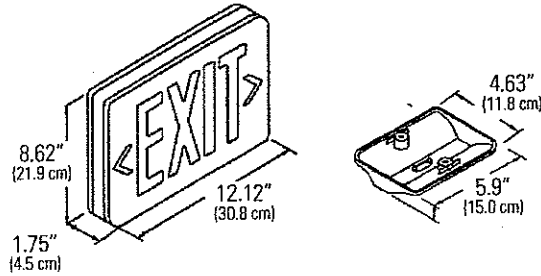




The LL Series Thermoplastic LED Exit is a compact exit sign that blends with modern interiors with its softly rounded corners and universal mounting configuration. The LL Series is extremely easy to install, and provides years of low cost, efficient service.



Dimensions with Self-Diagnostics Option



Complete Fixture consists of base exit sign.

How to Specify:

LL	N	U	R	W
SERIES	BATTERY	FACES	LETTER COLOR	STENCIL FACE/ HOUSING COLOR
LL = LL Series LED Exit	A = AC Only N = Nickel Cadmium	U = Universal	R = Red G = Green	W = White B = Black

Features

- Illumination:** Illumination of the exit stencil face is accomplished with long lasting, high output Light Emitting Diodes (LEDs). Hot spots and striations are eliminated by the internal "light chamber" especially designed around the high performance LED array. LEDs and support electronics have an expected service life of 25 years.
- Housing:** Constructed of impact resistant, UL 94 V-0, 5 VA white or black thermoplastic. NFPA-type field selectable chevrons can be installed/removed from outside the exit housing. Housing design simplifies installation, and does not require hard wire terminations inside of the exit housing. Product can also be ceiling mounted to a standard junction box by using the mounting canopy supplied.
- Electronics:** 120/277 VAC dual voltage input with surge-protected, solid-state circuitry. Charging system is complete with low voltage disconnect, AC lockout, brownout protection, AC indicator lamp and test switch.
- Battery:** Maintenance free, sealed nickel cadmium battery has an estimated service life of 10 years, and an operating temperature range of 20°F (-7°C) to 95°F (35°C).
- Input Power Requirements:** AC Only - Red: .93 W; Green: .72 W
Emergency Operation - Red: 1.55 W; Green: 1.85 W

Code Compliance

UL 924 listed for damp locations

Warranty

Three year full electronics warranty
Five year full plus five year pro-rated nickel cadmium battery warranty

Options

SD = Self-Diagnostics

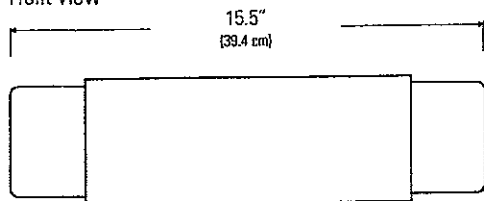
Job Information	Type: EX
Job Name: CHIEF LOGAN STATE PARK	
Cat. No.: LLNURW	
Lamp(s):	
Notes:	

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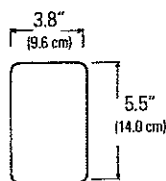
LIGHTOLIER®

The E1 Series is a decorative emergency lighting product with integral lamps. Ideal for wall or ceiling mount applications, the E1 Series' unique design will allow maximum lighting efficiency with its fully adjustable lamps.

Front View



Side View



Complete Fixture consists of unit and two lamp reflector systems. Select options and accessories below.

How to Specify:

E1

SERIES

E1 = 6V Thermoplastic
Emergency Lighting Unit

12L

BATTERY/
WATTAGE

Lead Calcium
12L = 12W Unit
18L = 18W Unit
25L = 25W Unit³
Nickel Cadmium
12N = 12W Unit³
14N = 14W Unit³
18N = 18W Unit³
25N = 25W Unit³

T6

LAMP
TYPE¹

T6 = Tungsten 5.4W
T7 = Tungsten 7W
T9 = Tungsten 9W
H7 = Halogen 7W
H12 = Halogen 12W

W

HOUSING
COLOR

W = White
B = Black

Features

- 1. Illumination:** Includes two high performance lamp reflector systems integral to the housing. Each lamp reflector system can be adjusted 180° vertically and horizontally.
- 2. Housing:** Constructed of impact resistant, UL 94 V-0, 5VA white or black thermoplastic. Easy to install with its snap-together backplate and housing.
- 3. Electronics:** 120/277 VAC dual voltage input with surge-protected, solid-state circuitry. Charging system is complete with low voltage disconnect, AC lockout, brownout protection, AC indicator lamp and test switch.
- 4. Battery:** Maintenance free, sealed lead calcium battery has an estimated service life of 5 years, and an operating temperature range of 65°F (19°C) to 85°F (30°C). Maintenance free, sealed nickel cadmium battery has an estimated service life of 10 years, and an operating temperature range of 20°F (-7°C) to 95°F (35°C).
- 5. Input Power Requirements:** 12w unit: 0.112 amps (120 VAC), 0.062 amps (277 VAC); 14-25w unit: 0.12 amps (120 VAC), 0.055 amps (277 VAC)

Code Compliance

UL 924 listed, UL damp location listing on selected units only.

Options (add to end of catalog number)

SD = Self-Diagnostics⁴

V = Voltmeter (not available with Ammeter (A) option)²

A = Ammeter (not available with Voltmeter (V) option)²

ST = Special Input Transformer (specify voltage and frequency)

SDTD = Self-Diagnostics with Time Delay

DL = UL Damp Location Listing (Consult factory)³

LCK1 = Line Cord (6', 120 VAC field installed)

Multiple option configurations may void UL listing. Consult factory for specifics.

Accessories (ordered separately)

SCKTW = Ceiling Mount Canopy, White

SCKTB = Ceiling Mount Canopy, Black

WG5 = Wire Guard

PCS1 = Polycarbonate Vandal Shield

NOTES:

1) Selected lamp wattage cannot exceed unit output rating.

2) Not available for use with SD and SDTD options.

3) Selected models are available with damp location option.

4) Not available for use with DL option.

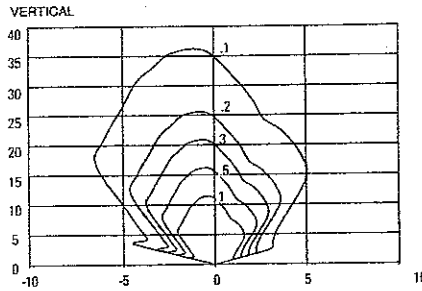
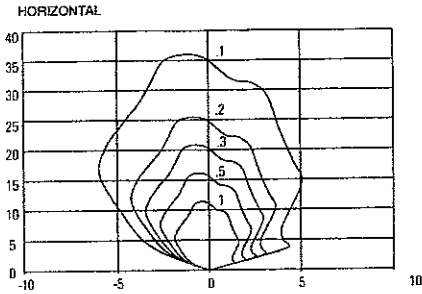
Job Information	Type: EM
Job Name: CHIEF LOGAN STATE PARK	
Cat. No.: E112LT6W	
Lamp(s):	
Notes:	

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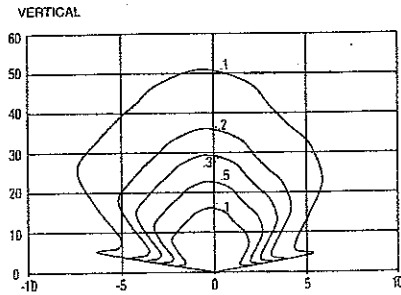
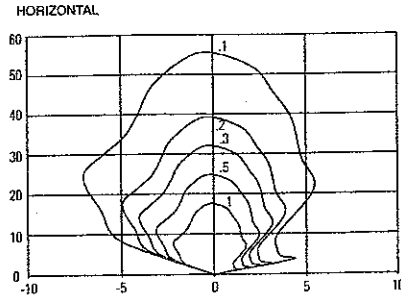
LIGHTOLIER®

Lamp Head Photometrics

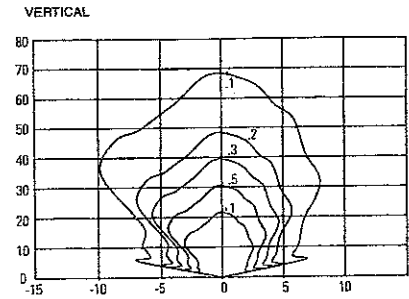
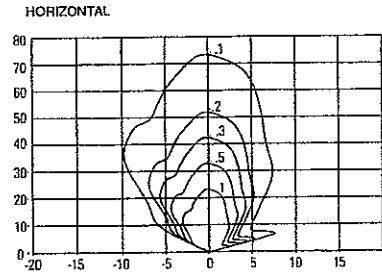
T6 - 6 Volt, 6 Watt, Tungsten



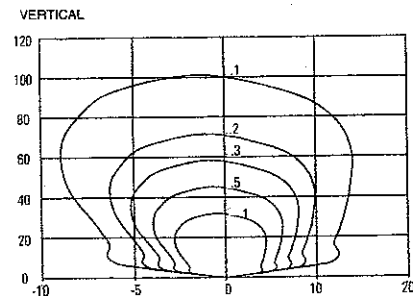
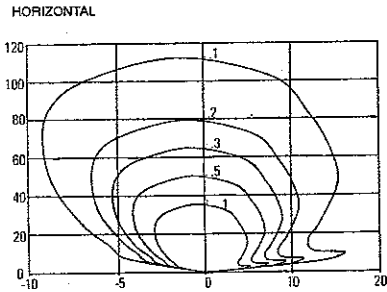
T7 - 6 Volt, 7 Watt, Tungsten



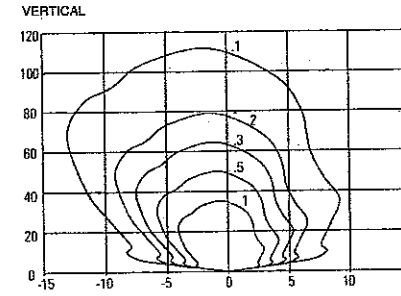
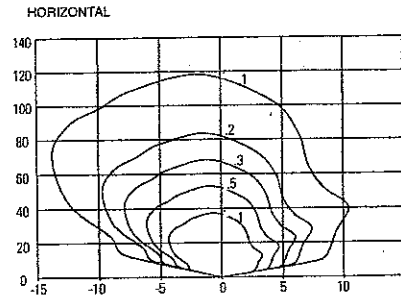
T9 - 6 Volt, 9 Watt, Tungsten



H7 - 6 Volt, 7 Watt, Halogen



H12 - 6 Volt, 12 Watt, Halogen



Unit Battery Capacity

DC Voltage	Unit	Suggested Lamp Head	Watts to 87% of Rated Voltage*	
			1½ hrs.	2 hrs.
6	E112L	T6	12.0	—
6	E118L	T6	18.0	13.5
6	E125L	T6	25.0	19.0
6	E112N	T6	12.0	—
6	E114N	T6	14.0	10.5
6	E118N	T6	18.0	13.5
6	E125N	T6	25.0	19.0

* Per NEC Specifications

Warranty

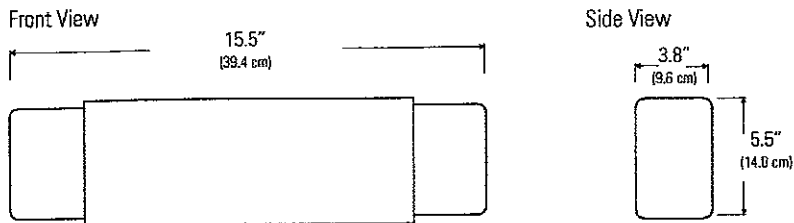
Electronics: 3 years
 Battery: 1 year full, 4 years pro-rata (lead calcium);
 5 year full, 5 years pro-rata (nickel cadmium)

Job Information Type: EM

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LIGHTOLIER[®]

The E1 Series is a decorative emergency lighting product with integral lamps. Ideal for wall or ceiling mount applications, the E1 Series' unique design will allow maximum lighting efficiency with its fully adjustable lamps.



Complete Fixture consists of unit and two lamp reflector systems. Select options and accessories below.

How to Specify:

E1	18L	T6	W	SDTD
SERIES	BATTERY/ WATTAGE	LAMP TYPE ¹	HOUSING COLOR	
E1 = 6V Thermoplastic Emergency Lighting Unit	<u>Lead Calcium</u> 12L = 12W Unit 18L = 18W Unit 25L = 25W Unit ³ <u>Nickel Cadmium</u> 12N = 12W Unit ³ 14N = 14W Unit ³ 18N = 18W Unit ³ 25N = 25W Unit ³	T6 = Tungsten 5.4W T7 = Tungsten 7W T9 = Tungsten 9W H7 = Halogen 7W H12 = Halogen 12W	W = White B = Black	

Features

- Illumination:** Includes two high performance lamp reflector systems integral to the housing. Each lamp reflector system can be adjusted 180° vertically and horizontally.
- Housing:** Constructed of impact resistant, UL 94 V-0, 5VA white or black thermoplastic. Easy to install with its snap-together backplate and housing.
- Electronics:** 120/277 VAC dual voltage input with surge-protected, solid-state circuitry. Charging system is complete with low voltage disconnect, AC lockout, brownout protection, AC indicator lamp and test switch.
- Battery:** Maintenance free, sealed lead calcium battery has an estimated service life of 5 years, and an operating temperature range of 65°F (19°C) to 85°F (30°C). Maintenance free, sealed nickel cadmium battery has an estimated service life of 10 years, and an operating temperature range of 20°F (-7°C) to 95°F (35°C).
- Input Power Requirements:** 12w unit: 0.112 amps (120 VAC), 0.062 amps (277 VAC); 14-25w unit: 0.12 amps (120 VAC), 0.055 amps (277 VAC)

Code Compliance

UL 924 listed, UL damp location listing on selected units only.

Options (add to end of catalog number)

- SD = Self-Diagnostics⁴
- V = Voltmeter (not available with Ammeter (A) option)²
- A = Ammeter (not available with Voltmeter (V) option)²
- ST = Special Input Transformer (specify voltage and frequency)
- SDTD = Self-Diagnostics with Time Delay
- DL = UL Damp Location Listing (Consult factory)³
- LCK1 = Line Cord (6', 120 VAC field installed)

Multiple option configurations may void UL listing. Consult factory for specifics.

Accessories (ordered separately)

- SCKTW = Ceiling Mount Canopy, White
- SCKTB = Ceiling Mount Canopy, Black
- WG5 = Wire Guard
- PCS1 = Polycarbonate Vandal Shield

NOTES:

- Selected lamp wattage cannot exceed unit output rating.
- Not available for use with SD and SDTD options.
- Selected models are available with damp location option.
- Not available for use with DL option.

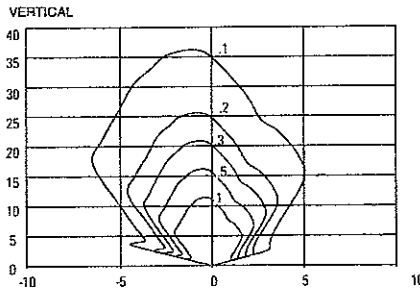
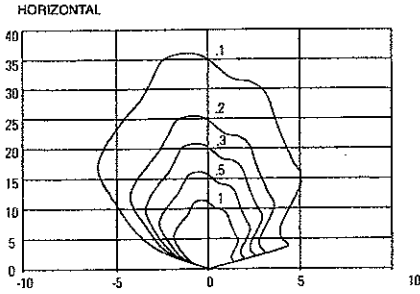
Job Information	Type: EM1
Job Name: CHIEF LOGAN STATE PARK	
Cat. No.: E118LT6W/SDTD	
Lamp(s):	
Notes:	

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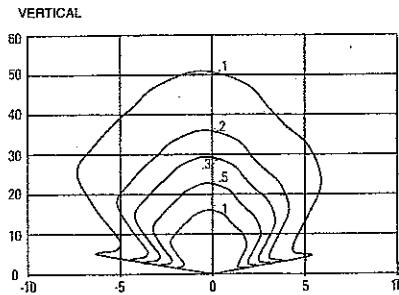
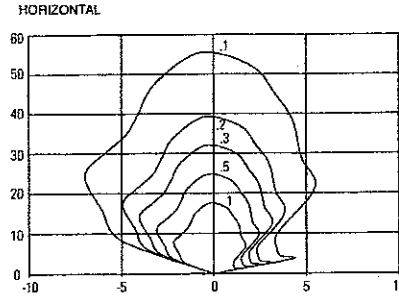
LIGHTOLIER®

Lamp Head Photometrics

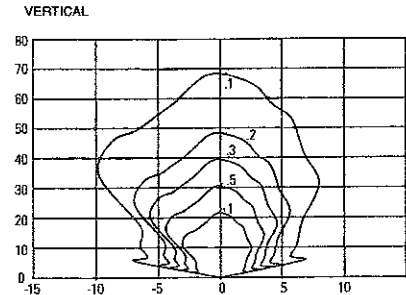
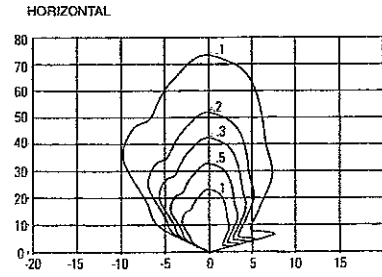
T6 - 6 Volt, 6 Watt, Tungsten



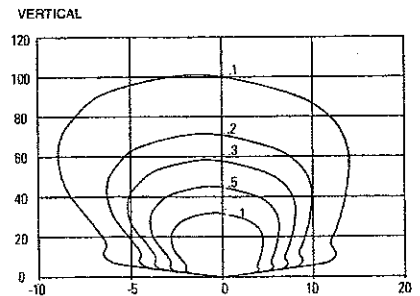
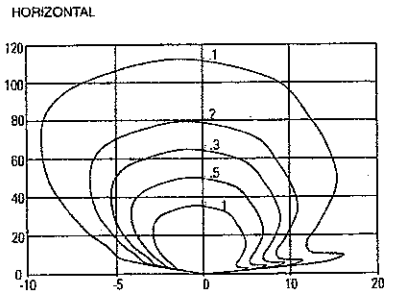
T7 - 6 Volt, 7 Watt, Tungsten



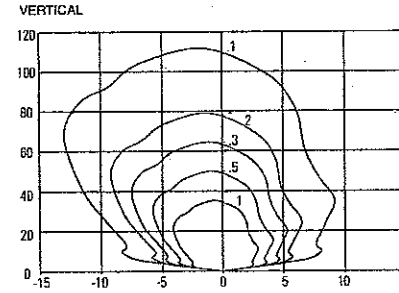
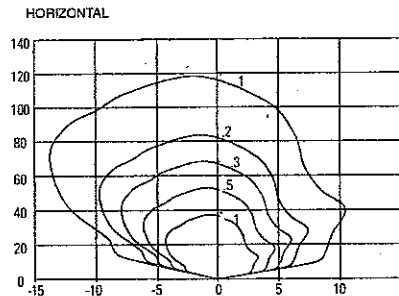
T9 - 6 Volt, 9 Watt, Tungsten



H7 - 6 Volt, 7 Watt, Halogen



H12 - 6 Volt, 12 Watt, Halogen



Unit Battery Capacity

DC Voltage	Unit	Suggested Lamp Head	Watts to 87% of Rated Voltage*	
			1½ hrs.	2 hrs.
6	E112L	T6	12.0	—
6	E118L	T6	18.0	13.5
6	E125L	T6	25.0	19.0
6	E112N	T6	12.0	—
6	E114N	T6	14.0	10.5
6	E118N	T6	18.0	13.5
6	E125N	T6	25.0	19.0

* Per NEC Specifications

Warranty

Electronics: 3 years
 Battery: 1 year full, 4 years pro-rata (lead calcium);
 5 year full, 5 years pro-rata (nickel cadmium)

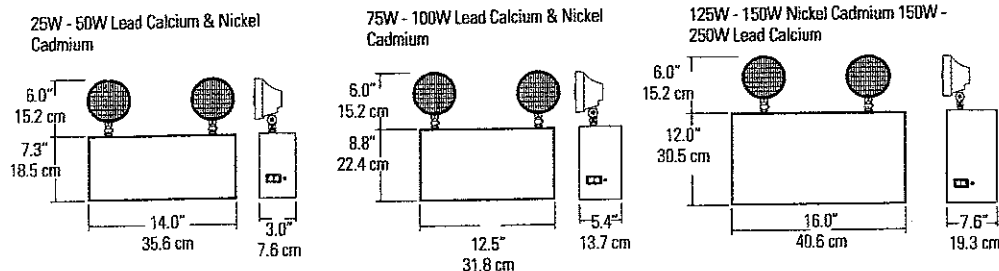
Job Information Type: **EM1**

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LIGHTOLIER®

E4 Series Emergency Lighting **E42**

The E4 Series provides egress lighting in a wide variety of wattages. The classical steel housing and high performance electronics make the units ideal for commercial or light industrial applications.



Complete Fixture consists of unit and two lamp heads. * Select options and accessories below.

How to Specify:

E4	2	12L	<input type="checkbox"/>	<input type="checkbox"/>	W
SERIES	VOLTAGE	BATTERY/ DC WATTAGE	# OF LAMP HEADS	SUGGESTED LAMP HEADS	HOUSING COLOR
E4 = Steel Emergency Lighting Unit	2 = 12V	12V Lead Calcium 36L = 36W 50L = 50W 10L = 100W 15L = 150W 25L = 250W 12V Nickel Cadmium 25N = 25W 50N = 50W 75N = 75W 10N = 100W 12N = 125W ¹ 15N = 150W ¹	3 = Three 2 = Two 1 = One Blank = No Heads	12V Tungsten Wedge Base RT9 = 9W RT12 = 12.5W RT18 = 18W	W = White

12L-125W

NOTES:
 1) Units above 50W cannot be shipped with lamp heads included or installed.
 2) For additional lamp heads, see RT66 Specification Sheet.

Features

- 1. Illumination:** Allows up to three mounted lamp heads. The standard lamp head incorporates a high performance parabolic reflector with a wedge base tungsten lamp. Allows maximum spacing between units along a path of egress.
- 2. Housing:** Constructed of 20 gauge (25-100w) or 18 gauge (125-250w) steel with a white corrosion-resistant, epoxy powder coat finish. Easily mounted with keyhole slots or shelf mounting. Universal j-box mounting pattern on 25-50w units.
- 3. Electronics:** 120/277 VAC dual voltage input with surge-protected, solid-state circuitry. Charging system is complete with low voltage disconnect, AC lockout, brownout protection, AC indicator lamp and test switch.
- 4. Battery:** Maintenance free, sealed lead calcium battery has an estimated service life of 5 years, and an operating temperature range of 65°F (19°C) to 85°F (30°C). Maintenance free, sealed nickel cadmium battery has an estimated service life of 10 years, and an operating temperature range of 20°F (-7°C) to 95°F (35°C).
- 5. Input Power Requirements:** 120 VAC - 0.18 amps, 18 watts (25-100w units); 0.58 amps, 60 watts (125-250w units)

Code Compliance

UL 924 listed.

Options

- SD = Self-Diagnostics
- SA = Self-Diagnostics with Alarm
- V = Voltmeter
- A = Ammeter
- T1 = 120 VAC Time Delay
- T2 = 277 VAC Time Delay
- LCK1 = Line Cord (6', 120 VAC field installed)
- F1 = 120 VAC Fuse
- F2 = 277 VAC Fuse
- P1 = 120 VAC Power Switch

Options (continued)

- P2 = 277 VAC Power Switch
 - DC = DC Power Switch
 - ST = Special Input Transformer (specify voltage and frequency)
- Multiple option configurations may void UL listing. Consult factory for specifics.

Accessories

- WGS = Wire Guard (36-100w lead calcium, 25-50w nickel cadmium)
- WG = Wire Guard (125-250w lead calcium, 100-150w nickel cadmium)
- MLSHELFW = White Mounting Shelf (36-50w lead calcium, 25-50w nickel cadmium)
- MJSHELFW = White Mounting Shelf (75-100w lead calcium)
- MXSHELFW = White Mounting Shelf (125-250w lead calcium, 100-150w nickel cadmium)

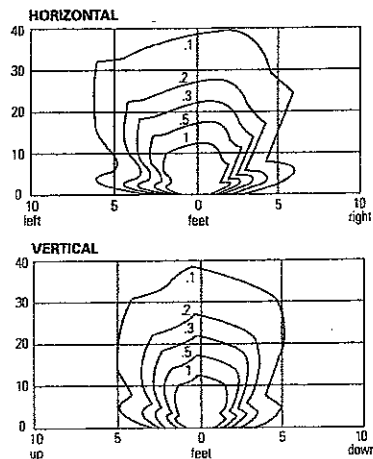
Job Information	Type: EM2
Job Name: CHIEF LOGAN STATE PARK	
Cat. No.: E4212L/W/T2	
Lamp(s):	
Notes:	

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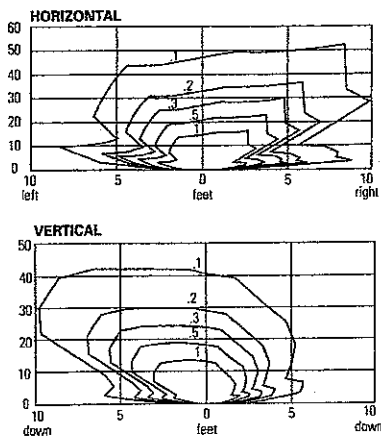
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Lamp Head Photometrics

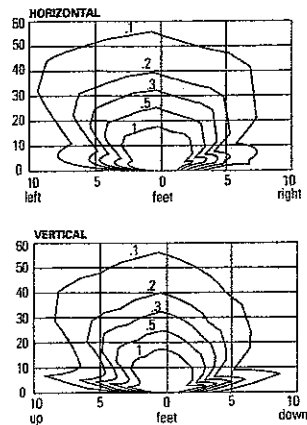
RT9- 12 Volt, 9 Watt, Tungsten



RT12- 12 Volt, 12.5 Watt, Tungsten



RT18- 12 Volt, 18 Watt, Tungsten



Unit Battery Capacity

DC Voltage	Unit	Suggested Lamp Head	Watts to 87% of Rated Voltage*			
			1 1/2 hrs.	2 hrs.	4 hrs.	8 hrs.
12	E4236L	RT9	36	27	14	7.2
	E4250L	RT9	50	37.5	19	10
	E4210L	RT18	100	75	38	20
	E4215L	RT18	150	112.5	72	25.5
	E4225L	RT18	250	187.5	95	50
	E4225N	RT9	25	19	9.5	—
	E4250N	RT9	50	37.5	19	10
	E4275N	RT9	75	56.5	28.5	15
	E4210N	RT18	100	75	38	20
	E4212N	RT18	125	94	47.5	21.5
	E4215N	RT18	150	112.5	72	25.5

* Per NEC Specifications

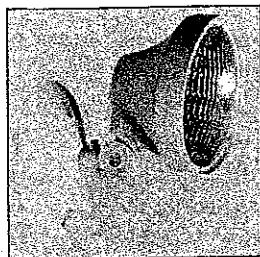
Warranty

Electronics: 3 years
 Battery: 1 year full, 4 years pro-rata (lead calcium);
 5 year full, 5 years pro-rata (nickel cadmium)

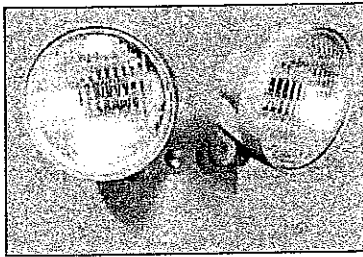
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Job Information **Type:** EM2

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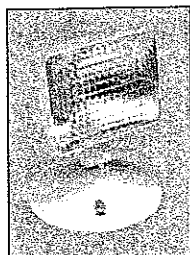
Shown: Lamp Head: (1) RT66W
Mounting Plate: (1) MB1*



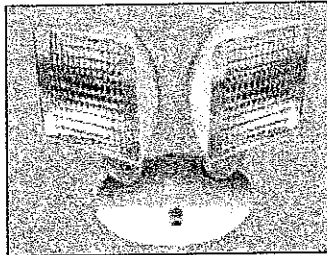
Shown: Lamp Head: (2) RT66W
Mounting Plate: (1) MB2*

Thermoplastic Wedge Base Round Head

- Constructed of impact resistant, UL 94 V-0, 5 VA thermoplastic
- White or black with matching mounting plates
- Available with sealed beam Par 36 or wedge base, tungsten or halogen lamps
- Lamps easily replaced by removing the snap-in retainer ring



Shown: Lamp Head: (1) S66W
Mounting Plate: (1) MW1*



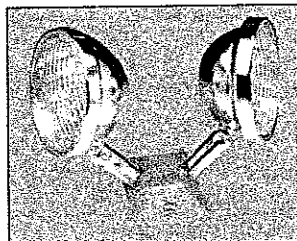
Shown: Lamp Head: (2) S66W
Mounting Plate: (1) MB2*

Polycarbonate Wedge Base Rectangular Head

- Constructed of polycarbonate
- Available in white, black or tan with matching mounting plates
- Features 6 volt or 12 volt tungsten T-5 wedge base lamps
- Lamps easily replaced by removing snap ring



Shown: Lamp Head: (1) CT86
Mounting Plate: (1) MP1S*



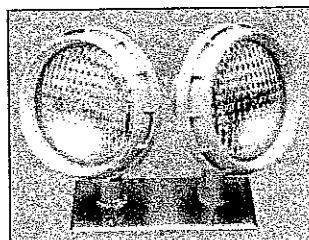
Shown: Lamp Head: (2) CT86
Mounting Plate: (1) MP2*

Thermoplastic & Metal Chrome Sealed Beam Par 36

- Constructed of impact resistant, UL 94 V-0, 5 VA thermoplastic or chrome-plated steel
- Available with 6 volt or 12 volt sealed beam tungsten or halogen lamps
- Lamps easily replaced by removing snap ring



Shown: Lamp Head: (1) HT86
Mounting Plate: (1) MP1*



Shown: Lamp Head: (2) HT86
Mounting Plate: (1) MP3*

Industrial Polycarbonate Sealed Beam Par 36

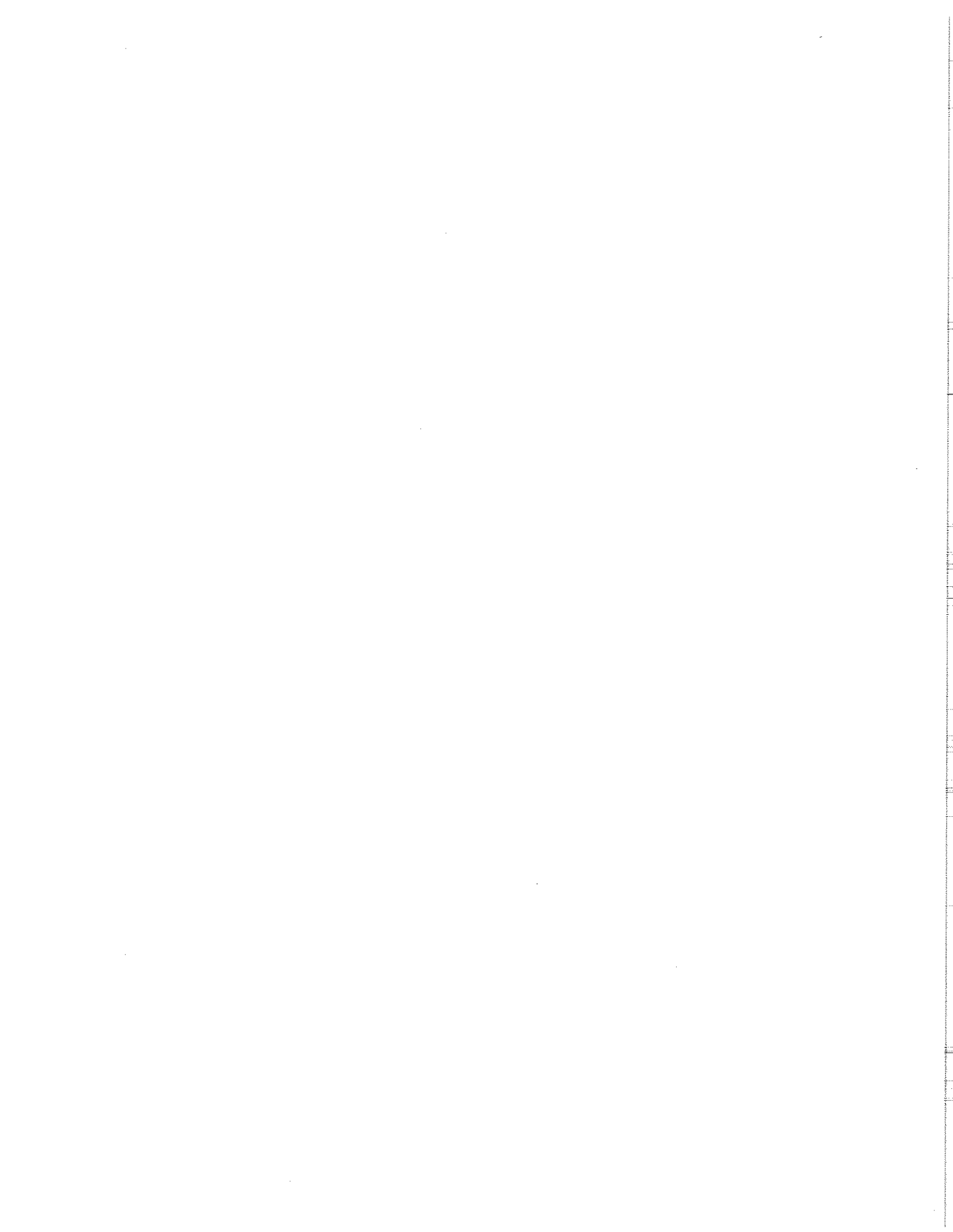
- Available for NEMA or Class 1, Division 2 applications
- Constructed of gray polycarbonate
- Available with 6 volt or 12 volt Par 36 sealed beam tungsten or halogen lamps
- Optional shatterproof lens for food service applications
- Lamp heads are fully gasketed
- Lamps easily replaced by removing ring bezel

* See MP1 spec sheet for mounting plates

Job Information	Type:	RH
Job Name: CHIEF LOGAN STATE PARK		
Cat. No.: IT2512/CSMP2		
Lamp(s):		
Notes:		

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SIGN IN SHEET

CHIEF LOGAN STATE PARK LODGE & CONFERENCE CENTER
 RECREATION CENTER
 RFP No. DNR - 90044

NAME	COMPANY/ADDRESS	FAX
Danny Smith	OVAL Const. Management	(304) 347-8821
Hop White	Wiseman Const. [344-1200]	(304) 344-1281
Scotty Cethman	AYSLETT Const Co	(304) 733 6463
Don Proo	PROE CONST CO.	(606) 456-8526
Chad Edwards	D+E Electrical	(304) 946-4110
Jim Hirostey	Jim Hirostey Plumbing	304-239-3689
Lewis Angus	Pierson Tech Services	304-722-1846
PRESTON KING	PARAMOUNT BUILDERS	(304) 722-4230
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