



TABOR OPERA HOUSE LEADVILLE, CO
PROJECT MANUAL
PHASE 3: REHABILITATION OF EXTERIOR ENVELOPE
FOR BIDDING AND CONSTRUCTION

CITY OF LEADVILLE IFB PROJECT No. 2024-001

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2024

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Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. The removal of existing brick for exterior wall repairs.
 - 2. The removal of existing window and door components for window and door rehabilitation work.
 - 3. Also included is all other such minor demolition and cutting as shall be required to carry out the work of each Section of these Specifications.
- B. Related work:
 - 1. 04210 Brick and Stone Masonry
 - 2. 08600 Window & Door Rehabilitation

1.02 Protection

- A. Comply with applicable local, state and federal codes and regulations pertaining to safety of persons, property and environmental protection.
- B. Conduct demolition to minimize interference with adjacent building areas. Maintain protected egress and access at all times.
- C. Provide, erect, and maintain temporary barricades, security devices, guard rails and lighting as necessary and as required by applicable regulatory agencies, to protect workers and occupants of building.
- D. Prevent movement or settlement of structures. Provide, engineer and place bracing or shoring and be responsible for safety and support of structure.
- E. Cease operations if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

1.03 Existing Services

- A. Arrange and pay for disconnecting, removing and capping utility services within areas of demolition. Disconnect and stub-off. Notify the Owner, the TOHPF and the affected utility company in advance before starting this work.
- B. Place markers to indicate location of disconnected services.

Part 2 – PRODUCTS

2.01 Materials

- A. Except where noted or specified otherwise, maintain possession of materials being demolished; immediately remove from site.

Part 3 – EXECUTION

3.01 Preparation

- A. Erect and maintain weatherproof closures for exterior openings.
- B. Erect and maintain temporary partitions to prevent spread of dust, fumes, noise, and smoke. On completion, remove partitions and repair surfaces that are damaged.
- C. Protect existing items that are not indicated to be altered.
- D. Disconnect, remove, and cap designated utility services within demolition areas.
- E. Mark location of disconnected utilities.

3.02 Execution

- A. Demolish in an orderly and careful manner as required to accommodate new work, including that required for connection to the existing building. Protect existing supporting structural members.
- B. Except where noted otherwise (such as the retention of the existing brick and stone for repairs), immediately remove demolished materials from site.
- C. Perform demolition in accordance with applicable authorities.
- D. Remove materials to be re-installed or retained in a manner to prevent damage.
- E. Repair all demolition performed in excess of that required, at no cost to the Owner.
- F. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
- G. Do not burn or bury materials on site.
- H. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.

END OF SECTION 02220

04100 Mortar and Pointing

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Preparation of the proper historic mortar mix.
 - 2. Repointing the brick.
- B. Related work:
 - 1. 04210 Brick and Stone Masonry
 - 2. 04900 Masonry Cleaning

1.02 Quality Assurance

- A. Comply with the recommendations of “Preservation Briefs 2: Repointing Mortar Joints in Historic Brick Buildings”.
- B. The Preservation Briefs can be viewed online at the following website:
<http://www.nps.gov/hps/tps/briefs/presbhom.htm>
- C. Installer’s Qualifications
 - 1. Provide for all work to be done by skilled and experienced tradesmen specializing in this type of work.
 - 2. The work of this section shall be executed under the continuous supervision and direction of a competent mason.
 - 3. Thoroughly experienced, reliable and competent workmen shall be in charge of all mortar mixing for the duration of the job.

1.03 Submittals

- A. Before commencement of work, the contractor shall complete two (2) 3-foot by 3-foot test areas, in a location selected by the Architect, demonstrating all aspects of the repair procedure for both brick and stone masonry. The completed panels are to be used as the standard reference for acceptance or rejection of all pointing work on the job.
- B. Submit dry labeled samples of all materials to be used on the job. The approved samples shall become the standard materials used on the project. Substitutions shall not be permitted without written approval from the architect.

1.04 Handling

- A. All materials are to be kept dry and protected from weather and contamination.

- B. Any material that has deteriorated or has been contaminated shall not be incorporated into the work and must be removed from the site.

Part 2 – PRODUCTS

2.01 Materials

- A. Portland Cement: ASTM C150, Type I or Type II as required to make mortar color match original with no more than 0.60% alkali and no more than 0.15% water soluble alkali.
- B. Lime: ASTM C207, Type S, Hydrated Lime for Masonry Purposes or lime putty.
- C. Sand: ASTM C144; Sand color, size and texture should match the original as closely as possible to provide the proper visual characteristics, including color match, without other additives.
- D. Water: Clean and potable and free from deleterious amounts of acids, alkalies or large amounts of organic materials.
- E. Bonding Agents: The use of chemical agents to increase the bond of the new mortar to the old mortar and masonry units is prohibited.
- F. Admixtures: The use of calcium chlorides and/or air-entraining agents is prohibited.

2.02 Mortar

- A. Measure dry ingredients by volume and thoroughly mix ingredients before the addition of any water.
- B. Add half of the water, followed by mixing for approximately five minutes.
- C. Add remaining water in small portions until a mortar of the desired consistency is reached. (The total volume of water necessary may vary from batch to batch, depending on weather conditions.)
- D. Use mortar within 30 minutes of final mixing. “Re-tempering” or adding more water after the initial mix is prepared is not permitted.

2.03 Mortar Mix

- A. Recommended Mortar Formulations**:

Use as a starting point for developing the proper mortar mix. Several trial mixtures will be required to arrive at a mix that matches the original with respect to color and texture.

04100 Mortar and Pointing

Mortar Type	Portland Cement	Lime	Sand/ Aggregate *
<u>Mortar for 1901 Addition</u> Sample #1	0	2	7
<u>Mortar For 1879 Structure</u> Sample #2	0	2	7

* The sand/aggregate for the replacement mortar should match the color and gradation of the existing mortar aggregates.

** The mortar formulation is based upon a mortar analysis conducted by Built Environment Evolution of Boulder, Colorado. The report, dated 10 June 2020, follows this section.

Part 3 – EXECUTION

3.01 Environmental Requirements

- A. All materials must be kept above 40 degrees F.
- B. No mortar may be placed when the temperature is below 32 degrees F, or below 40 degrees F and falling.
- C. Repointing must not be done at temperatures above 80 degrees F unless shading and water-misted burlap over new work is provided.
- D. All work must be suspended during frosty weather unless a heated enclosure is provided. Work should not be done in full sun at temperatures above 80 degrees F unless shading of the walls is provided and the masonry wall temperature is kept below this point. Burlap sacking and water misting may be necessary to control evaporation. High temperatures can cause flash setting of cements and rapid evaporation of water in the mix, leading to lack of development of final strength by the cement.
- E. All newly laid masonry mortar shall be protected against freezing until it is set and dry.

3.02 Workmanship

- A. Joint Preparation for Repointing
 - 1. Remove old mortar to a minimum depth of 2½ times the width of the joint to ensure an adequate bond and to prevent mortar “pop-outs”. For most brick joints, this will require ½ to 1 inch. Any loose or disintegrated mortar beyond this minimum depth should be removed.
 - 2. The use of power tools for the removal of mortar is strictly prohibited.
 - 3. Remove mortar cleanly from the bricks, leaving square corners at the back of the cut.
 - 4. Prior to filling the joints, rinse joints with a jet of water to remove all loose particles and dust.
 - 5. Any masonry units damaged during joint preparation shall be removed and replaced with new units matching the original.
- B. Filling the Joint/Repointing
 - 1. Immediately before repointing operations commence, the area to be pointed is to be thoroughly flushed with water to remove all dust and to wet the surface well until suction is controlled and the surface stays wet.
 - 2. Pointing is to be built up in layers not exceeding ¼ inch in depth; the bottom layers must be allowed to set (thumb-print hardness) before subsequent layers of mortar are applied.
 - 3. After the final layer of mortar has set, the joint is to be tooled lightly to give the final required form. Do not overwork the face of the joint. Head joints must be tooled first.
 - 4. All masons are to use identical jointing tools.
 - 5. Tool joint behind the face of the masonry units to match the existing historic joint.
- C. Workmanship, New Brick and Stone Masonry
 - 1. Lay up new brickwork and stonework to match original work.
 - 2. Build walls to the same thickness as existing walls unless noted otherwise on the drawings.
 - 3. Lay up brick and stone using a pliable, low water content mortar to avoid lime bloom, runs, or staining. Brick and stone used in this work shall be soaked in clean water and thoroughly drained.
 - 4. Joints shall be the same width as the original and bonding patterns of the original construction shall be followed. The new

04100 Mortar and Pointing

joints shall match the original joints in the manner in which they were struck. Tooling of the finished joint should be done at the proper stage of firmness in order to insure uniform color and texture.

3.03 Cleaning and Protecting

- A. Remove excess mortar immediately from adjacent surfaces.
- B. As work proceeds, clean all masonry with stiff natural bristle brushes. Metal brushes are strictly prohibited.
- C. Confirm that mortar is fully hardened prior to cleaning – 30 days after work is completed.
- D. Remove efflorescence with dry stiff natural or nylon bristle brushes and water.

END OF SECTION 04100



TABOR OPERA HOUSE LEADVILLE, CO

MORTAR REPORT

June 10, 2020

Prepared for
Agave Landscape and Masonry
By
Built Environment Evolution



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MORTAR REPORT

A BRIEF HISTORY OF MORTAR

Lime mortars have been used for thousands of years, and over time various techniques and additives have been handed down via the craftsmen of the trade. Different applications required different combinations of sands, lime and pozzolanic additives. Lime was often slaked on site, or barrels of lime putty that had been allowed to slake for up to two years were brought to the site. Sand shape and size and the final use would determine the proportions of the mix. Pozzolanic additives, such as brick dust, fly ash, and volcanic ash, created a harder, more durable mortars that could be constructed to set in any environment, including under water. Portland cement was first patented in 1824, and first manufactured in the US in 1872. It was used as an additive to mortars in small amounts to strengthen and accelerate the set time of the mortar. Portland cement became more prevalent, and in the 1930s premixed, bagged mortar was introduced, at which time the use of lime mortars began to decline significantly.

REPAIR WORK WITH MORTAR

Lime mortars take years to develop to full strength, but deteriorate over time, particularly when contact with water allows the lime to leech. Leaking gutters, settlement, cracking, rising damp, and efflorescence are some of the signs and causes of deterioration. When repair work is warranted, the root cause of the deterioration must be solved before any work to the mortar can begin. Without eliminating the cause of deterioration, repair efforts will be wasted.

Matching the existing mortar mix is critical to the longevity of the structure. The use of a mortar or Portland cement that is harder than the masonry units will cause damage. In addition, a denser Portland cement can act as a vapor barrier causing additional damage to the masonry units and joints. Lime mortars act as expansion joints, allowing the structure to expand and contract without pulling apart. Sand gradation, color and shape must be matched in addition to the ratio of lime in order to match appearance as well as function. Weather conditions, water content, and temperature can all affect the success of the curing of the mortar. An experienced mason familiar with historic mortars can generally replicate original mortars with the identification of the historic mortar mix.



CHARTS

The charts below illustrate the various characteristics and make up of the samples collected.

Table 1: Description of Sample location on Structure – as provided by the Preservation Studio

SAMPLE #	LOCATION
1	1901 Addition
2	Original Structure

Table 2: Description before testing, Hardness and Color

SAMPLE #	HARDNESS	COLOR
1	Hard	Warm Medium Gray
2	Hard	Medium Gray

Table 3: Aggregate Shape and Gradation

SAMPLE #	AGGREGATE SHAPE	AGGREGATE GRADATION
1	Sub angular	Very Fine - Very (Very!) Coarse
2	Sub angular	Very Fine - Very (Very!) Coarse



Table 4: Color of Fines

SAMPLE #	COLOR OF FINES	COLOR OF SANDS
1	10YR 7/2	10YR 7/2
2	2.5Y 8/1	2.5Y 7/1

Table 5: Total Percentages

SAMPLE #	% LIME	% FINES	% SANDS	% PORTLAND	% OTHER
1	18	4	70	0 -4.99	0
2	20	8	70	0 -4.99	0

CONCLUSIONS

The staff at Agave Landscapes and Masonry collected two different mortar samples from the Tabor Opera House in Leadville, CO. Each sample had the Cliver test applied, an acid digestion test used to determine the Portland Cement, lime, fines and sands ratios. Sands and fines are then matched for size, color and shape so the project mason may replicate the original mortar mix. Results showed the two samples to be very similar, with the significant difference occurring in the color shift in the sands.

Historic Mortar Mix:

1. **SAMPLE #1:** Replication of historic mortar mix is 2 part hydrated lime to 7 parts sand. Match color, size, and shape of sands for best match. Note large aggregate present, and color shift of the sands from Sample #2 (see Table 4).
2. **SAMPLE #2:** Replication of historic mortar mix is 2 part hydrated lime to 7 parts sand. Match color, size, and shape of sands for best match. Note large aggregate present, and color shift of the sands from Sample #1 (see Table 4).



MORTAR ANALYSIS FORMS

PO BOX 21433 BOULDER, CO 80308 303.562.5872



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

Project: Tabor Opera House	Location: Leadville, CO
Sample #: 1, 1901 Addition	
Date Taken: May 2020	Date Examined: June 09, 2020
By: Agave - TH	By: BEE - NFL
Sample description before testing: Medium gray, hard, sub angular aggregate, very fine to very coarse.	

Test I: Determine the Amount of Calcium Carbonate

1	5	Weight of Sample
2	4.5	Volume of Sample
3	0.27	Liters of CO ₂ released = V. Original Reading 600ml. Final reading 870ml.
4	0.203796	Corrected volume is V corrected for barometric pressure and temperature. Corrected Volume = $V \times \frac{620}{760} \times \frac{273}{295} = V \times 0.816 \times 0.925$
5	0.00909804	CO ₂ = Moles CaCO ₃ = M = V (corrected)/22.4
6	0.90980357	Grams CaCO ₃ = M x 100 (molecular weight of CaCO ₃ is 100).
7	10YR 7/2	Fines Color
8	10YR 7/2	Sands Color
9	0	Hair or fiber present; type: Large aggregate
10	2.5	Weight of original filter paper
11	2.7	Weight of filter paper with fines
12	0.2	Cc's of fines
13	111.4	Weight of beaker
14	114.9	Weight of beaker with sand
15	3.4	Volume of sand
	CONCLUSIONS	
16	0.18	Lime parts per weight
17	0.20	Lime parts per volume
18	0.04	Fines parts per weight
19	0.06	Fines parts per volume
20	0.70	Sands parts per weight
21	0.75	Sands parts per volume



BUILT ENVIRONMENT EVOLUTION
PRESERVING THE PAST TRANSFORMING TOMORROW

Project: Tabor Opera House	Location: Leadville, CO
Sample #: 2, Original Structure	
Date Taken: May 2020	Date Examined: June 09, 2020
By: Agave - TH	By: BEE - NFL
Sample description before testing: Warm medium gray, hard, sub angular aggregate, very fine to very coarse.	

Test I: Determine the Amount of Calcium Carbonate

1	5	Weight of Sample
2	4.5	Volume of Sample
3	0.30	Liters of CO ₂ released = V. Original Reading 600ml. Final reading 900ml.
4	0.22644	Corrected volume is V corrected for barometric pressure and temperature. Corrected Volume = $V \times \frac{620}{760} \times \frac{273}{295} = V \times 0.816 \times 0.925$
5	0.01010893	CO ₂ = Moles CaCO ₃ = M = V (corrected)/22.4
6	1.0189286	Grams CaCO ₃ = M x 100 (molecular weight of CaCO ₃ is 100).
7	2.5Y 8/1	Fines Color
8	2.5Y 7/1	Sands Color
9	0	Hair or fiber present; type:
10	2.4	Weight of original filter paper
11	2.8	Weight of filter paper with fines
12	0.4	Cc's of fines
13	111.2	Weight of beaker
14	114.7	Weight of beaker with sand
15	3.6	Volume of sand
	CONCLUSIONS	
16	0.20	Lime parts per weight
17	0.21	Lime parts per volume
18	0.08	Fines parts per weight
19	0.08	Fines parts per volume
20	0.70	Sands parts per weight
21	0.72	Sands parts per volume

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Brick for wall repairs and wall reconstruction.
 - 2. Accessories.
- B. Related work:
 - 1. 04100 Mortar and Pointing
 - 2. 04900 Masonry Cleaning

1.02 References

- A. ACI 530 – Building Code Requirements for Masonry Structures.
- B. ACI 530.1 – Specifications For Masonry Structures.
- C. ASTM C216 – Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
- D. IMIAC – International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.03 Quality Assurance

- A. Perform Work in accordance with applicable ASTM Standards and the recommendations of “Preservation Briefs 2: Repointing Mortar Joints in Historic Brick Buildings”.
- B. The Preservation Briefs can be viewed online at the following website:
<http://www.nps.gov/hps/tps/briefs/presbhom.htm>
- C. Installer’s Qualifications
 - 1. Provide for all work to be done by skilled and experienced tradesmen specializing in this type of work.
 - 2. The work of this section shall be executed under the continuous supervision and direction of a competent mason.
 - 3. Thoroughly experienced, reliable and competent workmen shall be in charge of all mortar mixing for the duration of the job.

1.04 Submittals

- A. Brick Samples: Submit four samples of proposed replacement brick units to illustrate color, texture and size.

1.05 Regulatory Requirements

- A. Conform to applicable code requirements for masonry construction.

1.06 Environmental Requirements

- A. Cold Weather Requirements: IMIAC – Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- B. Hot Weather Requirements: IMIAC – Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

Part 2 – PRODUCTS

2.01 Masonry Units

- A. Face Brick: ASTM C216
 - 1. Match existing units in size, shape, texture, color range, and hardness. (As a rule of thumb, approximately 25% of the masonry units should match the small sized units of the original materials, approximately 50% should match the median, and 25% should match the large units.)

2.02 Accessories

- A. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

Part 3 – EXECUTION

3.01 Examination

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 Loose and Replacement Units

- A. Loose masonry units are to be carefully removed and reset in a full bed of mortar.
- B. The unit cavity is to be cleaned out of all loose material and washed with water to remove dust; prewet the adjacent material.
- C. Units are to be reset in a solid and evenly filled bed of mortar, notwithstanding current trade practice.

04210 Brick and Stone Masonry

- D. Units are to be set true and level matching exactly the existing bond pattern and coursing throughout.
- E. All joint widths are to match existing original work. Joints are to be squeezed tight; slushing of joints is not permitted.
- F. Heavy masonry units that are loose are to be wedged tight into position with wooden wedges previously soaked in water; the joints are to be cleaned out and the units repointed in situ.
- G. Replacement units are to match the original material in size, shape, texture, color range, and hardness.
- H. All masonry repairs must be completed before commencing repointing. Joints in repaired areas are to be raked back $\frac{3}{4}$ " and allowed to set and dry for at least 72 hours to allow shrinkage to take place.

3.03 Cleaning

- A. Remove excess mortar and mortar smears immediately from adjacent surfaces.
- B. Replace defective mortar. Match adjacent work.
- C. As work proceeds, clean all masonry with stiff natural bristle brushes. Metal brushes are strictly prohibited.
- D. Confirm that mortar is fully hardened prior to cleaning – 30 days after work is completed.
- E. Remove efflorescence with dry stiff natural or nylon bristle brushes and water.

3.04 Protection of Finished Work

- A. Without damaging completed work, provide protective boards at exposed external corners that may be damaged by construction activities.

END OF SECTION 04210

04900 Masonry Cleaning

Part 1 – GENERAL

1.01 Summary

- A. This Section includes:
 - 1. The cleaning of the brick and stone on all masonry wall surfaces.
- B. Related work:
 - 1. 04210 Brick and Stone Masonry

1.02 Quality Assurance

- A. Installer’s Qualifications: Provide for all work to be done by skilled and experienced tradesmen specializing in this type of work.

1.03 Submittals

- A. Before commencement of work, the contractor shall complete a 3-foot by 3-foot test area on both types of masonry, following the manufacturer’s application instructions for the cleaner/stain remover specified, for suitability. Allow the test panel to dry 3 to 7 days before inspection. Keep the test panel available for comparison throughout the cleaning project.
- B. Submit Material Safety Data Sheets (MSDS Sheets) indicating health risks, flammability, handling and storage precautions for items required under this Section.

1.04 Delivery, Storage, and Handling

- A. Materials are to be delivered, stored, and handled to protect them from damage, extreme temperature, and moisture in accordance with Manufacturer’s written instructions.
- B. Deliver and store material in Manufacturer’s original, unopened containers with the production date shown on the container or packaging.
- C. Comply with the Manufacturer’s written specifications and recommendations for mixing, application, and curing of mortars.

1.05 Protection / Site Conditions

- A. Cold Weather Requirements: Do not work in temperatures below 40 degrees F, when the substrate is colder than 40 degrees F, or when the temperature is expected to fall below 40 degrees F for 48 hours prior to installation of masonry cleaner. Building an enclosure and heating areas

to maintain this temperature may only be done with the written approval of the Architect.

- B. Hot Weather Requirements: Hot temperatures or windy conditions may cause paint stripper to dry during long dwell periods, causing the stripping action to stop. Reduce dwell times to avoid drying.
- C. Protect all non-masonry surfaces and window/door openings from moisture infiltration and damage during application of stone cleaner.

Part 2 – PRODUCTS

2.01 Manufacturer

- A. PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax (785) 830-9797. Website: www.prosoco.com.

2.02 Product Description

- A. Brick and Stone Cleaner: Prosoco Enviro Klean SafRestorer.
 - 1. Test product on each type of masonry for suitability and effectiveness.
 - 2. Technical Data:
 - a. Form: Clear, light yellow liquid
 - b. Specific Gravity: 1.11
 - c. pH: 2.9
 - d. Wt./Gal.: 9.15 lbs.
 - e. Total Solids: N/A
 - f. VOC Content: N/A
 - g. Flash Point: N/A
 - h. Freeze Point: 28 degrees F (-2 degrees C)

Part 3 – EXECUTION

3.01 Application of Cleaner

- A. Prior to application, read “Preparation” section in the Manufacturer’s Product Data Sheet. Refer to Product Data Sheet for recommended dilution for intended use.
- B. Brick and Stone:
 - 1. Working from the bottom to the top, thoroughly prewet the surface with fresh water.
 - 2. Apply the cleaning solution freely from the bottom of the work area to the top. Apply with an acid-resistant brush, heavy nap roller or low-pressure (50 psi max) spray.

04900 Masonry Cleaning

3. Let the cleaning solution stay on the wall 5 to 15 minutes. If the cleaner starts to dry, reapply.
4. Reapply the cleaning solution to heavily soiled areas. Scrub gently with a non-abrasive brush or synthetic scrubbing pad.
5. Working from the bottom to the top, thoroughly rinse treated surfaces with clean water. Make sure to flush all spent cleaner and dissolved soiling from the surface, surface pores and adjacent non masonry surfaces. Rinse spent cleaner and dissolved contaminants from the wall with masonry-washing equipment generating 400 – 1,000 psi with a water flow rate of 6-8 gallons per minute. Use a 15-45 degree fan spray tip. Heated water (150-180 degrees F) may improve cleaning efficiency. Use adjustable equipment for reducing water flow-rates and rinsing pressure as needed for sensitive surfaces.

C. Limit contact of cleaner with glass.

3.02 Clean-up

- A. Clean equipment with fresh water.
- B. Protect adjacent non-masonry surfaces from contact with cleaner and paint stripper. If contact occurs, rinse immediately.

END OF SECTION 04900

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Rough construction wood and plywood framing.
 - 2. Wood sheathing.
 - 3. Wood blocking, grounds, backing, stripping, cants, and nailers as indicated, specified to be furnished under other Sections.
- B. Related work:
 - 1. 07533 EPDM Membrane Roofing
 - 2. 07600 Flashing and Sheet Metal

1.02 References

- A. APA – Plywood Construction Guide.
- B. PS 1-83 (U.S. Department of Commerce): Plywood.
- C. PS 20 (U.S. Department of Commerce): American Softwood Lumber.
- D. WCLIB – Standard Grading Rules 16.
- E. WWPA – Grading Rules.

1.03 Quality Assurance

- A. Requirements of Regulatory Agencies: Conform to Building Code requirements for construction, nailing and connections.
- B. Wood framing shall conform to IBC Chapter 23.
- C. Framing lumber shall comply with the latest edition of the National Design Specification.
- D. All sawn lumber shall be stamped with the grade mark of a lumber grading agency certified by the American Lumber Standards Committee.
- E. Perform rough carpentry under the direction of a competent and experienced foreman.

1.04 Delivery, Storage, and Handling

- A. Store lumber materials, plywood and metal items off the ground, protected from rain and dampness.

1.05 Project Conditions

- A. Coordinate with related trades and plan the framing and furring to accommodate structural members, finish materials, piping, conduits, mechanical and electrical equipment, accessories, and fixtures.

Part 2 – PRODUCTS

2.01 Materials

- A. Lumber:
 - 1. Moisture content: 19% maximum at time of permanent closing in of building for lumber 2” or less nominal thickness. For lumber of greater thickness, conform to PS-20 requirements.
 - 2. Surfacing: Surface four sides (S4S), unless specified otherwise.
- B. Rough Hardware: Simpson, Universal or equal.
 - 1. Bolts and Nuts: ASTM A307; galvanized for exterior or exposed use.
 - 2. Wood Screws and Adhesives: Meeting APA specifications. Provide screws and adhesive attachment.
 - 3. Nails: FS FF-N-105.

2.02 Plywood

- A. All plywood shall conform to PS 1-83 or APA PRP-108 and have an exterior or exposure 1 durability classification and shall bear the stamp of an ICBO approved testing agency or as specified on the Structural Drawings.
- B. Lay up sheets with long dimension perpendicular to supports and stagger joints.
- C. At walls, provide 2 x wood blocking at all unsupported edges.
- D. All nailing shall be with common nails.

Part 3 – EXECUTION

3.01 General Installation Requirements

- A. Fabricate, size, install, connect and fasten, bore, notch, and cut wood and plywood framing with joints true, tight, and well nailed, screwed, or bolted as required, all members with solid bearing without being shimmed. Set horizontal members subject to bending with crown up. Install framing plumb, square, true, and cut for full bearing. Splices are not permitted between bearings. Perform cutting for other trades under direction of trade involved. Wherever necessary to avoid splitting, sub-drill for nails and screws with diameter of hole smaller than that of nails or screws.

06100 Rough Carpentry

- B. Provide framing members of sizes, and with spacing and anchorage, as required and in accordance with recognized standards. Do not splice structural members between supports.
- C. Do not notch, drill or splice joists, beams or load bearing or structural studs without prior approval of Architect.

3.02 Nailing

- A. All nailing shall be with common nails.
- B. All nailing not noted shall be according to Table 2304.9.1 Fastening Schedule of the International Building Code.

3.03 Lag Screws

- A. Place by screwing; do not hammer drive into place. Install screws with anchorage embedment into piece lagged of not less than 60% of screw length of 8 diameters. Provide standard malleable iron or steel plate washers under heads. Bore a hole of same diameter and depth as the shank. For threaded portion of screw, bore the hole with a bit not larger than base of thread.

3.04 Bolts

- A. Clamp wood members together and bore holes true to line and 1/32" larger than the bolt diameter. Provide standard malleable iron or steel washers under heads and nuts when bearing on wood. Draw nuts up tight as installed and again just prior to being enclosed with other materials or at completion.
- B. Plate anchor bolts shall be 1/2" diameter placed not to exceed 4'-0" o.c. unless noted otherwise.
- C. Anchor bolts shall be placed within 8" of all jambs, corners, intersections and wall ends.

END OF SECTION 06100

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Roofing membrane
 - 2. Base flashing
 - 3. Flashings
 - 4. Fasteners, adhesive and sealants
- B. Related work:
 - 1. 07600 Flashing and Sheet Metal

1.02 References

- A. Roof system shall comply with all I.C.B.O. requirements, match FM I-90 wind uplift resistance criteria and be compatible with application on specified deck.
- B. UL Listed Products: Provide materials that have been tested and listed by UL for Class A.

1.03 Submittals

- A. Submit complete description, specifications, and details of total roof system.
- B. Shop Drawings: Submit shop drawings showing sheet layout, seam locations, penetrations, special conditions and details not standard with the manufacturer.
- C. Submit samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.

1.04 Quality Assurance

- A. Qualifications:
 - 1. Roof applicator shall have minimum of 5 years satisfactory continuous experience under the same company name and shall be approved in writing by roof system manufacturer for application of roof for which warranty will be issued. Submit satisfactory evidence of conformance.
 - 2. Roof system manufacturer shall have roofing systems installed in the State of Colorado with a minimum of 5 years satisfactory continuous performance.
- B. Pre-Roofing Conference:
 - 1. Meet at the project site and review requirements for the work and conditions that could possibly interfere with successful performance of the work. Require every

party who is concerned with the work or required to coordinate with it or to protect it thereafter, to attend the conference.

- 2. Confirm that the applicator and manufacturer accepts the roofing substrate. Coordinate with appropriate party any remedial action required to make substrate acceptable.
- 3. Where roofing is required to be guaranteed by the manufacturer, require manufacturer's technical representative to participate in the conference.

1.05 Warranty

- A. Provide a minimum 10-year written warranty to extend from date of the Notice of Acceptance and to cover materials and workmanship.
- B. Warranty to cover entire system and be signed by both applicator and manufacturer.

Part 2 – PRODUCTS

2.01 Manufacturers

- A. Sika Sarnafil G410 SA Self-Adhered System
- B. Carlisle Sure-Weld SAT (Self-Adhering Technology) Adhered Roofing System

2.02 Thermoplastic Membrane

- A. Polyester reinforced membrane with a lacquer coating, five (5) feet wide.
- B. Membrane shall conform to ASTM D4434 (latest version), "Standard for Polyvinyl Chloride Sheet Roofing", Classification: Type III.
 - 1. Sarnafil S327-12, 48 mil (1.2 mm), thermoplastic membrane with polyester reinforcement.
 - 2. Sure-Weld SAT TPO, 60 mil
- C. Certified Polymer Thickness: Membrane manufacturer is to certify that the polymer thickness is of the polymer thickness specified. Certification is to be signed by the membrane manufacturer's quality control manager. ASTM +/- tolerance for membrane thickness is not accepted.
- D. Color of Membrane: White

2.03 Protection Board

- A. DensDeck: A siliconized gypsum, fire-tested hardboard with glass-mat facers in 1/4" thickness. Lap overlayment board per manufacturer's recommendations.

Part 3 – EXECUTION

3.01 Substrate Inspection

- A. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

3.02 Membrane Attachment

- A. The thermoplastic membrane is to be attached with fasteners according to the membrane manufacturer's and Factory Mutual's requirements.
- B. Membrane overlaps shall be shingled with the flow of water where possible.
- C. Full-width rolls shall be fastened perpendicular to the direction of the wood deck where possible.

3.03 Hot-Air Welding of Seam Overlaps

- A. All seams shall be hot-air welded. Seam overlaps should be 5½ inches wide and 4 inches wide when hand-welding.
- B. Welding equipment shall be provided by or approved by the roofing membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by the roofing manufacturer's technical representative prior to welding.
- C. All membrane to be welded shall be clean and dry.
- D. The applicator shall check all welded seams for continuity using a rounded screwdriver. On-site evaluation of welded seams shall be made daily by the Applicator at locations as directed by the Owner's Representative or the roofing membrane manufacturer's representative.

3.04 Membrane Flashings

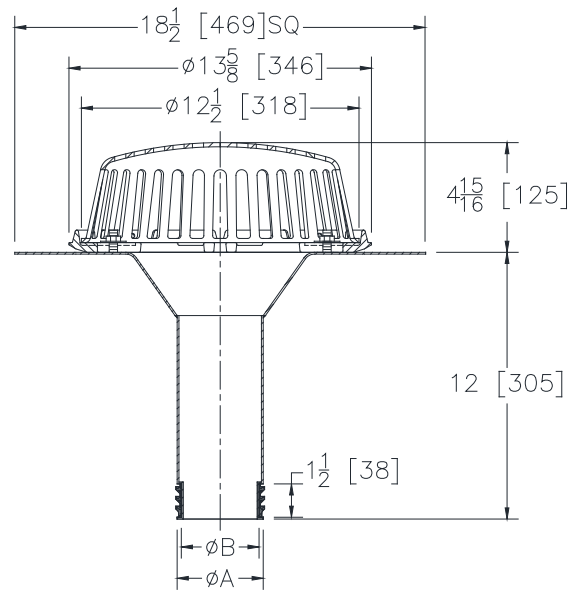
- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces.

3.05 Metal Flashings

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
 - 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
 - 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) – latest edition.
- B. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.
- C. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.
- D. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch.
- E. Counter flashings shall overlap base flashings at least 4 inches.

END OF SECTION 07533

Design and Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



Product	Pipe Size	A	B	Dome Open Area Sq. In. [cm]
__ RD2150-SS3	3 [76] Push-in	2-7/8 [73]	2-1/2 [64]	103 [665]
__ RD2150-SS4	4 [102] Push-in	3-7/8 [98]	3-1/2 [89]	
__ RD2150-SS5	5 [127] Push-in	4-7/8 [124]	4-1/2 [114]	
__ RD2150-SS6	6 [152] Push-in	5-7/8 [149]	5-1/2 [140]	

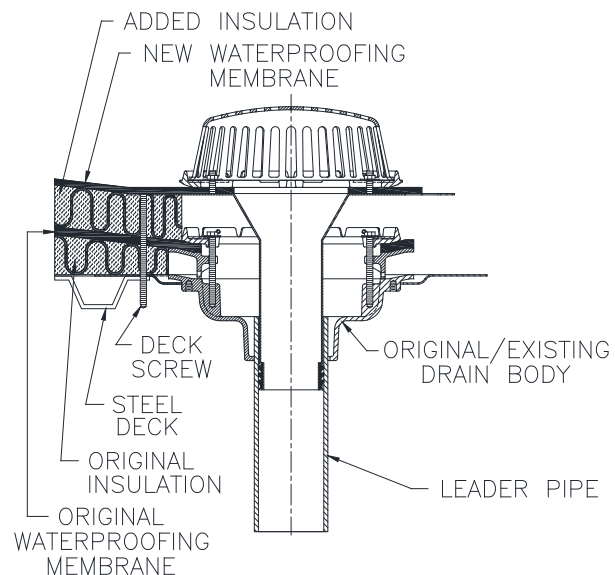
RD2150 Replacement Roof Drain Designed for renovation roof applications where existing roof drain bodies cannot be utilized. The RD2150 is designed to penetrate the old roof drain body, bonding securely to the inside of the drain pipe. The RD2150 is furnished with #16 gage Type 304 stainless steel body and neoprene gasket, complete with Dura-Coated cast iron clamp collar and dome with stainless steel hardware.

Options:

- ___ -AL Aluminum Dome Strainer
- ___ -FS Flat Sump Roof Drain Body
- ___ -VP Vandel Proof Screws for Dome

The RD2150 is installed inside of an existing drain. The drain is used where re-roofing is done over existing roofing, as well as total roof replacement renovation applications. The original roof drain need not be disturbed and the new drain is installed by insertion into the leader pipe. The neoprene gasket with one-way gripping ribs holds the drain in place. Once installed, the drain is held securely in place and sealed to the pipe, preventing possible leakage. Installation shows new insulation and membrane applied to roof. Note: Tie-down slots for fasteners are provided in the RD2150 flange. It is recommended these be utilized during construction to hold drain body firmly in place.

Typical Installation



WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov
ADVERTENCIA: Cáncer y daño reproductivo - www.P65Warnings.ca.gov
AVERTISSEMENT: Cancer et effets néfastes sur la reproduction - www.P65Warnings.ca.gov

Zurn Industries, LLC | Light Commercial Plumbing Products
 2640 South Work Street, Falconer, NY, 14733 Ph. 1-800/906-5060

Rev. C
 Date: 04/21/2023
 C.N. No. 145263
 Prod. | Dwg. No. RD2150

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Cap flashings
 - 2. Counterflashings
 - 3. Related clips, anchors, and fasteners.
- B. Related work:
 - 1. 07900 Joint Sealants

1.02 Quality Assurance

- A. Except as otherwise indicated, comply with the applicable sections of SMACNA “Architectural Sheet Metal Manual”, latest edition, including joints, seams, details and accommodation of thermal movement.
- B. Completed work must be free from water leakage under all weather conditions.

1.03 References

- A. Fed. Spec. QQ-S-775E.
- B. A653/A653M-03 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. A924/A924M-99 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

1.04 Warranty

- A. Sheet metal work shall be warranted for a period of two (2) years from the date of the Notice of Acceptance.
- B. Warranty shall include replacement at Contractor’s expense any defects that occur during the warranty period which, in the opinion of the Architect, are due to defective materials, workmanship, or for failure to allow for expansion/contraction.

1.05 Submittals

- A. Samples: Submit samples illustrating manufacturer’s standard colors of prefinished G90 galvanized sheet metal with Kynar 500 or Hylar 5000 PVDF paint finishes for flashing and sheet metal work.
- B. Colors to be selected by Architect and Owner from manufacturer’s standard colors.

Part 2 – PRODUCTS

2.01 Materials

- A. Sheet Metal: Galvanized steel, ASTM A-525; high performance coating designation: G-90 (90 oz/sf zinc-coated sheets); lock-forming quality conforming to ASTM A-52; prefinished with Kynar 500 or Hylar 5000 PVDF paint finishes. 24 gauge.
- B. Nails, Screws, Rivets, and other accessories: Best commercial quality. Material to match sheet metal. Provide as required for proper installation as specified and as shown.
- C. Sealant: Synthetic or rubber base sealants approved by Architect.
- D. Asphalt Plastic Cement: Not approved for this work.

Part 3 – EXECUTION

3.01 Installation

- A. General: Install all flashing and sheet metal in conformance with the drawings and the SMACNA “Architectural Sheet Metal Manual”. Coordinate flashing and sheet metal work with other trades for correct sequencing of items. Install work watertight, without waves, warps, buckles, tool marks, fastening stresses, distortion, or defects that impair strength or mar appearance. Install planes and lines to insure alignment. Allow for sheet metal expansion and contraction.
- B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
- C. Mastic sealed seams are not acceptable.

END OF SECTION 07600

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Openings in exterior walls and elsewhere as noted shall be pointed with sealant hereunder.
- B. Related work:
 - 1. 04210 Brick and Stone Masonry
 - 2. 08600 Window & Door Rehabilitation
 - 3. 09900 Painting

1.02 References

- A. Federal Specification FS-TT-S-227e.

1.03 Submittals

- A. Provide Manufacturer's Product Data.
- B. Samples: Submit samples of various types and colors of materials specified or intended for use on this project. Color to be selected by Architect.

1.04 Product Handling

- A. Deliver materials to the project or place of application in original unopened containers bearing manufacturer's name and product designation.
- B. Store materials in accord with manufacturer's instructions.
- C. Do not use materials upon which the shelf life date has expired. Remove these materials promptly from the Project Site.

1.05 Warranty

- A. Unless otherwise noted or specified, warrant all sealants and caulking against all defects of material and application for a period of five years after the date of Substantial Completion.
- B. Refer to specific specification sections for other warranty period requirements.

Part 2 – PRODUCTS

2.01 Sealant Materials

- A. Use sealants of the following types and manufacture as required by the drawings and specifications.
 - 1. Colors for all sealants shall be as selected by the Architect from manufacturer's standard colors.
 - 2. Coordinate the sealants required by various interfacing trades to ensure compatibility of sealants.
- B. Type designation: Sealant types with numerical designation as specified hereinafter refer to basic sealant materials.

2.02 Sealant Types

- A. For expansion joint sealer for use when the sealer is concealed in the finished work such as at telescoping joints in window frames, gutters, fascias, gravel stops, etc., non-drying butyl:
 - 1. PII 707.
 - 2. Tremco Curtain Wall Sealer.
- B. For openings in exterior walls required to be pointed with sealant, use Dow Corning 790.
- C. For other exterior and interior horizontal or vertical applications:
 - 1. For porous or non-porous surfaces wherein the sealant will not be covered by paint:
 - a. Dow Corning 790 or 795.
 - b. General Electric Silpruf.
 - 2. For porous or non-porous surfaces wherein the sealant will be covered by paint:
 - a. Pecora AC20, acrylic latex caulk (interior only).
 - b. Sikaflex 2c/NS.
 - c. Tremco Acrylic Latex Caulk (interior only).
 - d. Tremco Dymeric.
 - e. Elasto-Thane 920 (Pacific Polymers).
- D. For joints in gypsum wallboard, wood and laminated plastic:
 - 1. General Electric Silpruf.
 - 2. Dow Corning 795.
- E. For joints in horizontal surfaces subjected to foot traffic:
 - 1. Sonneborn "Sonolastic Paving Joint Sealant".
 - 2. Pecora NR-200.

07900 Joint Sealants

3. Elasto-Thane 227 H.S. (Pacific Polymers).

with a solvent such as methyl-ethyl ketone (MEK).

2.03 Incidental Materials

- A. Staining characteristics: Do not use joint filler, primer or other materials that would stain the sealant and the materials to which they are applied.
- B. Compressible joint filler: Taylor Foam, open cell polyethylene, or other compatible resilient material, recommended by the sealant manufacturer for use in conjunction with the sealant.
- C. Bond-breaker tape: Wrinkled or smooth faced masking tape, or other adhesive faced tape product which is adaptable to installation in the bottom of a solid-backed joint for the purpose of breaking bond between the sealant and the back of the joint.
- D. Primers: As recommended by the sealant manufacturer for use in conjunction with the sealant for application onto the various types of materials to which the sealant is applied. When the manufacturer's instructions make reference to use of primers or special surface preparations, comply with these instructions.
- E. Cleaners, where required by manufacturer's instructions in lieu of primers, shall be of the type and kind recommended by the manufacturer.
- F. Lead wool: Fine gage strands of lead adaptable to packing in reglet to form anchorage for sheet metal extended into reglet.
- G. Preformed compressible joint filler: Standard brand conforming to ASTM D1752, Type II or III, or Homex Expansion Joint, manufactured by the Homasote Co.

3.02 Application

- A. Accurately position joint filler within the joint to establish and control the uniform designated thickness of sealant.
 - 1. Exercise care in the installation of joint backing to see that the backing is not set too far below surface, thereby increasing the depth of the sealant.
- B. Apply material with sufficient pressure to completely fill the void space and to assure complete wetting of the contact area to obtain uniform adhesion.
 - 1. During application, keep tip of nozzle at bottom of joint, forcing sealant to fill from bottom to top.
 - 2. Move tip along joint to completely fill the joint. Finish joints smooth and flush with adjacent surface unless detailed otherwise.
- C. Perform joint preparation, including cleaning and priming, in accord with manufacturer's instructions. When solvents are used, wipe the dissolved contaminant and solvent from the surface promptly.
- D. Install bond-breaker tape to prevent bonding of the sealant with the backing or bottom of the joint.
- E. Do not allow sealants to remain on exposed surfaces.

END OF SECTION 07900

Part 3 – EXECUTION

3.01 Preparation

- A. Cut out defective existing sealants and existing sealants not complying with manufacturer's recommendation for thickness, including existing backing. Clean metals at joints with solvents as required to produce absolutely clean substrates.
- B. Where new sealant is to join existing, wipe remaining cut edges of existing cured sealant

Part 1 – GENERAL

1.02 Summary

- A. This Section includes:
 - 1. Repair and rehabilitation of wood storefront windows and window frames as specified in this section and on the drawings.
 - 2. Repair and rehabilitation of wood doors and frames.

1.02 Quality Assurance

- A. Comply with the recommendations of “Preservation Briefs 9: The Repair of Historic Wooden Windows”.
- B. Comply with the recommendations of “Preservation Briefs 10: Exterior Paint Problems on Historic Woodwork”.
- C. Comply with the recommendations of “Preservation Briefs 11: Rehabilitating Historic Storefronts”.
- D. The Preservation Briefs can be viewed online at the following website:
<https://www.nps.gov/orgs/1739/preservation-briefs.htm>
- D. Comply with The Northeastern Lumber Manufacturers Association (NeLMA) for grading of replacement wood.

1.03 Submittals

- A. Provide manufacturer’s literature on the epoxy repair system to be used for the limited repair of the wood window storefront sash, doors, and frames.
- B. Provide supplier’s information for the replacement wood to be used for repairs.
- C. Provide samples of replacement glass, if required.
- D. Provide manufacturer’s literature for weatherstripping.
- E. Provide manufacturer’s literature for replacement hardware.

Part 2 – PRODUCTS

- A. Replacement Wood: Eastern White Pine, D & Better Select, conforming to the exact dimensions of the material being replaced or repaired.
- B. Repair of Existing Wood: Refer to the General Notes.

Part 3 – EXECUTION

3.01 Repair

- A. Refer to the Drawings, General Notes, and Window Schedule that follow.
- B. General Notes
 - 1. If it is necessary to remove any storefront windows for repair, provide a weathertight and secure temporary closure at the opening consisting of Verolite Polycarbonate Twinwall Sheets or approved equal to provide light transmittance into the building interior.
 - 2. Storefront Window & Door Frames and Window Sills: The wood window sills and the bottom of the jambs at the wood frames are deteriorated due to exposure to the elements. Repair or replace in-kind. Refer to Drawings for additional information.
 - 3. Exterior Doors: The bottom of some of the stiles and rails are deteriorated from exposure to the elements. Reinforce the connections between the stiles and rails.
 - 4. Epoxy Repair: In very limited areas where the existing exterior wood at the storefront windows and window/door frames is split or checked, strengthen and stabilize the wood through consolidation using semi-rigid epoxies that saturate the porous decayed wood and then harden. The surface of the consolidated wood can then be filled with a semi-rigid epoxy-patching compound, sanded and painted. Epoxy patching compounds can be used to build up small missing sections or decayed ends of members. Profiles can be duplicated using hand molds, which are created by pressing a ball of patching compound over a sound section of the profile that has been rubbed with butcher’s wax.

Manufacturer:

Advanced Repair Technology, Inc.
P.O. Box 510
Cherry Valley, NY 13320
Tel: 607-264-9040
Toll Free: 866-859-2787

08610 Wood Window and Door Rehabilitation

E-mail:

contactadvancedrepair@gmail.com

The epoxy repair system includes ART 901 Prime-A-Trate Bonding Agent and Flex-Tec HV.

5. **Wood Replacement:** Where existing wood is highly deteriorated (i.e., dry, split and/or missing), replace the wood in-kind, matching existing profiles.
 6. **Hardware:** Remove existing window transom and door hardware for the window and door repairs. Package and label each set of hardware (including screws) identifying the window or door where it was removed and turn over to the TOHPF. Provide the following suitable replacement hardware:
 - a. Transoms: Provide and install missing transom operator hardware where applicable. Available from Van Dyke’s Restorers Cat. #204926 in Antique Brass Finish or similar. Confirm with Architect prior to ordering.
 - d. Doors: See Door Schedule on Drawings.
 7. **Painting:** The scope of this project includes the exterior finish painting of the storefronts and associated woodwork. The doors shall be finish painted on all sides. Many of the surfaces of the storefronts and doors have cracked and alligatored paint due to intercoat paint failure. All paint removal and repainting shall comply with the recommendations of “Preservation Briefs 10: Exterior Paint Problems on Historic Woodwork” and with the requirements of Section 09900 Painting.
 - a. Some paint removal may need to occur on-site. At those locations, use the gentlest means possible in order to avoid damage to the wood substrate: wet sanding or low level heat guns. This will also aid in controlling dust. *The lower layers of paint most likely contain lead.* Dispose of all hazardous waste according to applicable laws.
 - b. After removing paint from the storefronts, storefront window/door
- frames, and existing doors, treat the surfaces with a protective preservative coating. Then repaint with a primer prior to reglazing (if reglazing is necessary) followed by two finish coats of exterior paint. It is anticipated that three (3) paint colors will be selected by the Owner and Architect. Re: Specification Section 09900 Painting.
- c. Exterior paint should cover the beveled glazing compound or putty and lap over onto the glass slightly to complete a weathertight seal.
 8. **Sealant:** Provide sealant to bridge the joint between the brick mould and the masonry window and door openings. Carefully scrape out the existing compound and residue before applying new sealant. If the joint is large and deep, provide a backer rod. Protect the opening’s masonry surfaces.
 - a. Seal the joint between sill and jamb as well as between wood sill and subsill to reduce water penetration. Also apply exterior sealant to bridge the joint between the window frame and the brick mould.
 - b. Appropriate sealant is a one-part sealant that contains elastomeric polymers and synthetic resins that cures with atmospheric moisture to form a durable, flexible building sealant. Color to be selected by Architect.

Recommended Manufacturer:

Henkel Corporation

Avon, Ohio 44011

Tel: 800-624-7767

www.ositough.com

END OF SECTION 08600

Part 1 – GENERAL

1.01 Summary

- A. This Section includes:
 - 1. Mechanical door hardware
 - 2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
- B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
 - 1. Windows
- C. Related Sections:
 - 1. Division 7 - Joint Sealants for sealant requirements applicable to threshold installation specified in this section.
 - 2. Division 8 - Stile and Rail Wood Doors.
 - 3. Division 9 for touchup, finishing or refinishing of existing openings modified by this section.

1.02 References

- A. UL – Underwriters Laboratories
 - 1. UL 1784 – Air Leakage Tests of Door Assemblies
 - 2. UL 305 – Panic Hardware
- B. DHI – Door and Hardware Institute
 - 1. Sequence and Format for the Hardware Schedule
 - 2. Recommended Locations for Builders Hardware
 - 3. Keying Systems and Nomenclature
 - 4. Installation guide for Doors and Hardware
- C. ANSI – American National Standards Institute
 - 1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
 - 2. ANSI/BHMA A156.1 – A156.29, and ANSI/BHMA A156.31 – Standards for Hardware and Specialties
 - 3. ANSI/BHMA A156.28 – Recommended Practices for Keying Systems

1.03 Submittals

- A. General:
 - 1. Submit in accordance with Conditions of Contract.
 - 2. Prior to forwarding submittal:
 - a. Comply with procedure for verifying existing door and frame compatibility

- for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
 - b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - c. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
- B. Action Submittals:
 - 1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
 - 2. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
 - b. Submit with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by DHI.
 - c. Indicate complete designations of each item required for each door or opening, including:
 - 1. Door Index: door number, heading number, and Architect’s hardware set number.
 - 2. Quantity, type, style, function, size, and finish of each hardware item.
 - 3. Name and manufacturer of each item.
 - 4. Fastenings and other pertinent information.
 - 5. Location of each hardware set cross-referenced to indications on Drawings.
 - 6. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7. Mounting locations for hardware.
 - 8. Door and frame sizes and materials.
 - 9. Degree of door swing and handing.
 - 3. Key Schedule:
 - a. After Keying Conference, provide keying schedule that includes levels of

08710 Door Hardware

- keying, explanations of key system’s function, key symbols used, and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.
- C. Informational Submittals:
- 1. Product data:
 - a. Include warranties for specified door hardware.
- D. Closeout Submittals:
- 1. Operations and Maintenance Data – Include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule.
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
- quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project’s vicinity.
- 2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
 - 3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. Can provide installation and technical data to Architect and other related subcontractors.
 - b. Can inspect and verify components are in working order upon completion of installation.
 - 4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- B. Certifications:
- 1. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in “REFERENCES” article herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.
- C. Pre-Installation Meetings
- 1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key control system.
 - 4. Address for delivery of keys.
 - 2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer’s personnel,

1.04 Quality Assurance

- A. Qualifications and Responsibilities:
- 1. Recognized architectural hardware supplier with documented experience supplying mechanical door hardware similar in

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- equipment, and facilities needed to make progress and avoid delays.
- b. Inspect and discuss preparatory work performed by other trades
- c. Review required testing, inspecting, and certifying procedures.
- d. Review questions or concerns related to proper installation and adjustment of door hardware.

1.05 Delivery, Storage, and Handling

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

1.06 Coordination

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.08 Warranty

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use, or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1. Locks
 - a. Accurate 8600 Series: Per manufacturer
 - 2. Exit Devices
 - a. Von Duprin: 10 years
 - 3. Closers
 - a. LCN 400 series: 30 years

1.09 Maintenance

- A. Turn over unused materials to Owner for maintenance purposes.

Part 2 – PRODUCTS

2.01 Manufacturers

- A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

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2.02 Materials

A. Fabrication

1. Provide hardware manufactured to conform to published templates, generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturer's recognized installation standards for application intended.
2. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed. Advise the Architect where visible fasteners, such as thru-bolts, are required.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 Hinges

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
2. Acceptable Manufacturers and Products:
 - a. Hager BB 1191/1279 series
 - b. McKinney TB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch thick doors, up to and including 36 inches wide:
 - a. Exterior: Heavy weight, bronze or stainless steel, 4-1/2 inches high.
4. 1-3/4 inch thick doors over 36 inches wide:

- a. Exterior: Heavy weight, bronze/stainless steel, 5 inches high.
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches high.
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins

2.04 Flush Bolts

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Ives.
2. Acceptable Manufacturers:
 - a. Rockwood
 - b. DCI

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch steel or brass rods at doors up to 90 inches in height. For doors over 90 inches in height, increase top rods by 6 inches for each additional 6 inches of door height. Provide dust-proof strikes at each bottom flush bolt.

2.05 Mortise Locks – Narrow Style

A. Manufacturer and Product:

1. Scheduled Manufacturer:
 - a. Accurate
2. Acceptable Manufacturers:
 - a. Substitutes subject to Architect's approval.

B. Requirements:

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1. Provide narrow style mortise locks conforming to ANSI/BHMA A156.13, Grade 1 Operational and manufactured from heavy gauge steel, containing components of steel with zinc dichromate plating for corrosion resistance. Cylinders: Refer to “KEYING” article, herein.
2. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
2. Lever Trim: Matching levers and roses or escutcheons from manufacturer of standard mortise locks. Provide all necessary fasteners, spindles, and parts to make complete functioning unit.
 - a. Provide levers that return to within ½ inch of door face.
9. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.07 Cylinders

- A. Manufacturers and Products:
 1. Scheduled Manufacturer and Product:
 - a. Schlage
 2. Acceptable Manufacturers and Products:
 - a. Substitutes subject to Architect’s approval.
- B. Requirements:
 1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer’s series as indicated. Refer to “KEYING” article, herein.
 2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Patented Open: cylinder with permanent core with open keyway.
 3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
 4. Nickel silver bottom pins.

2.06 Exit Devices – Bar Type

- A. Manufacturer and Product:
 1. Scheduled Manufacturer:
 - a. Von Duprin 88 series.
 2. Acceptable Manufacturers and Products:
 - a. Substitutes subject to Architect’s approval.
- B. Requirements:
 1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
 2. Cylinders: Refer to “Keying” article, herein.
 3. Provide bar type exit devices, cast or forged of brass, bronze, or stainless steel, plated to standard architectural finishes to match balance of the door hardware.
 4. Latch Bolt Throw: ¾ inch for rim and mortise devices, 5/8 inch for surface and concealed vertical rod devices.
 5. Mechanism Case: One piece without cover plate. Mount flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
 6. Provide manufacturer’s standard strikes.
 7. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
 8. Furnish all necessary wood door kits and cover plates for proper installation of exit device.

2.08 Keying

- A. Scheduled System:
 1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner’s existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
 1. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 1. Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:

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1. Material: Nickel silver; minimum thickness of 0.107-inch.
 2. Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - d. Identification:
 1. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 2. Identification stamping provisions must be approved by the Architect and Owner.
 3. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 4. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 5. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - e. Quantity: Furnish in the following quantities:
 1. Master Keys: 6
 2. Change (Day) Keys: 2 per cylinder/core that is keyed differently.
 3. Key Blanks: Quantity as determined in the keying meeting.
- certify closers. Stamp units with date of manufacture code.
 2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
 3. Cylinder Body: 1-1/2 inch diameter piston with 5/8-inch diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
 5. Spring Power: Continuously adjustable over full range of closer sizes and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
 6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
 7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers that mount within 6-inch top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
 8. Pressure Relief Valve (PRV) Technology: Not permitted.
 9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117 or has special rust inhibitor (SRI).
 10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.09 Door Closers

- A. Manufacturers and Products:
 1. Scheduled Manufacturer and Product:
 - a. LCN 4040XP series.
 2. Acceptable Manufacturers and Products:
 - a. Substitutes subject to Architect's approval.
- B. Requirements:
 1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000

2.10 Thresholds, Seals, Door Sweeps, Automatic Door Bottoms, and Gasketing

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Zero International.
 - 2. Acceptable Manufacturers:
 - a. National Guard
 - b. Pemko
- B. Requirements:
 - 1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
 - 2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 3. Size of thresholds:
 - a. Saddle Thresholds: ½ inch high by 5 inches wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.
 - 4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.11 Finishes

- A. As specified in the Hardware Sets.

Part 3 – EXECUTION

3.01 Examination

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Preparation

- A. Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing door and frame for new hardware being installed.
 - 3. When modifications are exposed to view, use concealed fasteners, when possible.
 - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Wood Doors: DHI WDHS.5 “Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors.”

3.03 Installation

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 - 1. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S.1A
 - 2. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in Section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space

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- fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
 - H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
 - I. Door Closers & Auto Operators: Mount closers/operators on inside of exterior doors.
 - J. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section “Joint Sealants”.
 - K. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
 - L. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - M. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - N. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.
- B. Clean operating items as necessary to restore proper function and finish.
 - C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 Door Hardware Schedule

- A. The intent of the hardware specification is to specify the hardware for exterior doors, and to establish a type, continuity, and standard of quality. However, it is the hardware supplier’s responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the hardware schedule on the Drawings. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

3.04 Adjusting

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.05 Cleaning and Protection

- A. Clean adjacent surfaces soiled by door hardware installation.

END OF SECTION 08710

09900 Painting

Part 1 – GENERAL

1.01 Summary

- A. This section includes:
 - 1. Preparation of surfaces to be painted.
 - 2. Exterior painting.
- B. Related work:
 - 1. 08600 Window & Door Rehabilitation

1.02 Quality Assurance

- A. Coats: The number of coats specified is the minimum number acceptable. If full coverage is not obtained with the specified number of coats, apply such additional coats as are necessary to produce the required finish, at no extra cost to the Owner.
- B. Employ coats and undercoats for all types of finishes in strict accord with the recommendations of the paint manufacturer used unless otherwise specified in this Section. In case of conflict, comply with the most stringent.
- C. All paints shall comply with local, state and federal Air Quality mandates.

1.03 Submittals

- A. Materials
 - 1. Submit copies of a complete list of all materials, identified by manufacturer's name and product label or stock number.
 - 2. Product data: Manufacturer's technical information, paint analysis and application instructions for each proposed material.
- B. Submit Material Safety Data Sheets (MSDS Sheets) indicating health risks, flammability, handling and storage precautions for items required under this Section.
- C. Color samples:
 - 1. Colors, sheens and texture shall be submitted as shown on drawings.
 - 2. Submit, using materials accepted for the Project, samples of each color and paint finish.
 - 3. Size: 8 1/2" x 11".
- D. Mock-up: Provide mock-up of paint scheme for review. Size of mock-up to measure approximately 3'-0" x 3'-0". Location to be selected by Architect.

1.04 Product Handling

- A. Deliver materials to the Project Site in unopened containers bearing manufacturer's name and product descriptions corresponding to designation on material list.
- B. Store materials in a dry, clean, well ventilated area. Store containers closed. Comply with legal requirements.

1.05 Project Conditions

- A. Environmental Requirements:
 - 1. Comply with manufacturer's recommendations for environmental conditions under which coatings and coating systems can be applied.
 - 2. Apply no paint in direct sunlight, rain, fog or mist, or when ambient or surface temperature is below 50 degrees F.
- B. Protection: Protect adjacent surfaces from paint smears, spatters, over spray and droppings. Cover fixtures and non-removable hardware not to be painted. Mask off areas where necessary.
- C. Hardware: Insure that hardware is removed before painting is started and replaced only when paint finishes are thoroughly dry.

Part 2 – PRODUCTS

2.01 Materials

- A. Materials necessary to complete the painting as herein specified and listed by material numbers and names are standards for kind, quality and function taken from the list of architectural finishes of Benjamin Moore Paints.
- B. Substitutions: Equal products by Sherwin Williams Company may be submitted for consideration as substitutions at "A" above or as noted on the Drawings.
- C. Materials for undercoats and finish coats of paint shall be ready-mixed and shall not be changed, except thinning of undercoats (when required), reinforcing, or coloring, any of which shall be in strict accord with the recommendations of the manufacturer.

09900 Painting

Part 3 – EXECUTION

3.01 General

- A. Condition and prepare surfaces and apply materials in accordance with paint manufacturer's recommendations unless otherwise specified in this Section. In case of conflict, comply with the most stringent.

3.02 Condition of Surfaces

- A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence and quality of Work.
- B. Do not apply paint or finish until conditions are satisfactory.
- C. Application of first coat shall constitute acceptance of surface.

3.03 Surface Preparation

- A. Surfaces to receive paint shall be clean, dry, smooth and dust free before application of any material.
 - 1. Wood: Sand smooth and remove dust. Fill open joints, cracks, nail holes, and other pits or depressions flush and smooth with putty or wood dough after priming. Color putty to match finish paint coat. Touch up knots or sap streaks with shellac or other acceptable sealer before priming.
- B. Existing Surfaces to be repainted:
 - 2. Remove mildew by scrubbing with trisodium phosphate or a solution of bleach and water. Rinse with clean water and allow surface to dry completely.
 - 3. Remove coatings not suitable to receive new applied finishes from surfaces and prime to show defects, if any. Paint only after defects have been remedied.

3.04 Application

- A. Apply material evenly, free from sags, runs, or defects. Brush out smooth, leaving minimum of brush marks.
- B. Apply paint by brushes, rollers, or sprays as required to obtain specified finish.
- C. Tint all pigmented undercoats to approximately same shade as final coat.
- D. Allow each coat to thoroughly dry before succeeding coat application.

- E. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to ensure that surfaces, including edges, corners, and crevices receive a dry film thickness equivalent to that of flat surfaces.
- F. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- G. Prime Coats: Apply prime coat to material which is required to be painted or finished, and which has not been prime coated by others. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- H. Finish Coats: Completely cover to provide an opaque, smooth surface of uniform finish, color and coverage. Cloudiness, spotting, laps, brush marks, runs, sags, or other surface imperfections will not be acceptable.

3.05 Paint Finish Schedule

- A. Finish surfaces in accordance with the following procedure for the surface and finish desired thereon. Catalog names and numbers refer to products as stipulated under paragraph 2.01A, unless otherwise specifically noted. Numbers used to identify paint indicates the paint in white. Same materials shall be color selected.
- B. Wood Windows & Doors:
 - 1. Primer: Benjamin Moore Fresh Start Fast Dry Exterior Alkyd Primer (#094)
 - 2. First and Second Coats: Benjamin Moore Aura Exterior Paint Low Lustre (634).
 - 3. Colors of Existing Rehabilitated Windows:
 - a. Window frame and brick mould: BM Crownsville Gray HC-106
 - b. Window sashes: BM Old Prairie 2143-50.
 - 4. Colors for Phase 3: To be selected by Architect and Owner (3 colors maximum)

3.06 Clean-Up, Protection and Repair

- A. Clean-up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
 - 1. Upon completion of painting work, clean paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage adjacent finished surfaces.
- B. Protection: Protect work of other trades, whether to be painted or not, against damage from painting operations. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
- C. Repair: At the completion of work of other trades, touch up and restore all damaged or defaced painted surfaces.

3.07 Maintenance Materials

- A. Provide one gallon of each color and finish of paint, labeled with finish designations indicated on finish schedule. Containers shall be tightly sealed and clearly labeled for color, sheen and manufacturer.

END OF SECTION 09900

Entry Downlight

RECESSED DOWNLIGHT, RETROFIT HOUSING, MILLWORK TRIM, BLACK BEZEL, 50DEG BEAM WITH HONEYCOMB LOUVER, 9W, MIN 800 DELIVERED LUMENS, 2700K, 80+CRI. VERIFY CEILING THICKNESS.

CONNECT TO EMERGENCY GENERATOR WITH UL924 DEVICE OR PROVIDE EMERGENCY BATTERY.

NU3 LOPRO

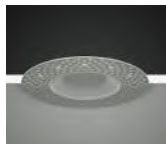
3" Round Downlight Standard White



15° - 60° BEAM (Note: Specifications are subject to change without notice)		
14mm COB PERFORMANCE DATA		
LED LIGHT ENGINE	NOMINAL DELIVERED LUMENS	SYSTEM WATTAGE
10LM	880LM @30K/80CRI	9W
15LM	1290LM @30K/80CRI	13W
20LM	1700LM @30K/80CRI	17W
25LM	2120LM @30K/80CRI	23W
30LM	2540LM @30K/80CRI	29W
10LM	740LM @30K/90CRI	9W
15LM	1080LM @30K/90CRI	13W
20LM	1430LM @30K/90CRI	17W
25LM	1780LM @30K/90CRI	23W
30LM	2130LM @30K/90CRI	29W
Notes	Delivered lumens based on 25C optic with No lens, (see page 2)	



Trim



Trimless



Trimless Millwork

FEATURES

- Double jointed driver box allows for 4" shallow plenum installation
- 15° - 60° optical beam control
- UGR <17
- Multiple mounting, glare control options, trims, and finishes available

DIMMING AND CONTROLS

- 0-10V dimming to 1%
- Leading & trailing edge (Triac / ELV) dimming to 1%

CONSTRUCTION

- Lexan™ (PC) highly resistant to impact and heat (240°F)
- Optimal material for wireless BLE signal connectivity
- Shatter proof acrylic bezel lens
- Electrocoated 16-gauge cold-rolled steel construction
- Accommodates ceiling thickness from 0.4" to 2.0"

LED

- 90 CRI: SDCM = 2-step MacAdam Ellipse, Lumen Maintenance: L₇₀ > 66,000 hrs
- 80 CRI: SDCM = 2-step MacAdam Ellipse, Lumen Maintenance: L₇₀ > 66,000 hrs

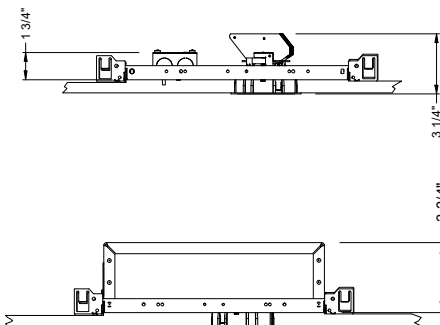
LISTING

- ULus Listed to UL1598 & UL2108; cUL Listed to CSA C22.2 #250.0
- IP65 with lens - Suitable for wet locations with lens - Suitable for damp locations without lens
- Non-conductive, dead-front construction (shower approved)
- Made in the USA - meets the requirements of the Buy American provision within the ARRA
- NSF/ANSI-2 with lens
- 5 Year Limited warranty

ELECTRICAL

- 120V-277V, 120 only Triac / ELV
- Power factor ≥ 0.9
- 2kV driver input surge protection
- Remote emergency test switch
- 7W, 10W (T20 CEC) and 12W EM 90min battery
- Max. ambient installation temperature 95°F (35°C)

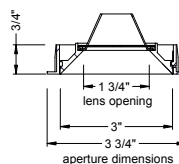
FIXTURE HEIGHT



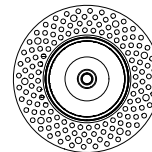
TRIMMED



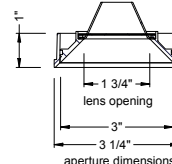
ceiling cutout
3-3/8" diameter
ceiling thickness
1/8" to 1-5/8"



TRIMLESS



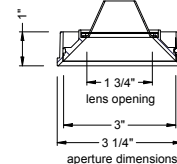
ceiling cutout
3-1/2" diameter



MILLWORK



ceiling cutout
3-1/2" diameter
ceiling thickness
3/8" to 1-3/4"



alphabet

PROJECT INFORMATION		
JOB NAME		TYPE
ORDERING CODE		

15°- 60° BEAM ORDERING CODE

SERIES	NU3	NU3																						
TYPE	RDLP	round downlight lopro																						
	RDTLP	round downlight trimless lopro																						
	RDTMWLP	round downlight trimless millwork lopro																						
LED	SW	standard white																						
DELIVERED LUMENS	10LM	880 lm																						
	15LM	1290 lm																						
	20LM	1700 lm																						
	25LM	2120 lm																						
	30LM	2540 lm																						
Standard Configuration: 3000K 80CRI NL Calculated Delivered Lumens = [Delivered Lumen Value] x [CCT Multiplier] x [Reflector Multiplier]																								
CCT	27K	2700K																						
	30K	3000K																						
	35K	3500K																						
	40K	4000K																						
	<table border="1"> <thead> <tr> <th>CCT</th> <th>2700K</th> <th>3000K</th> <th>3500K</th> <th>4000K</th> </tr> <tr> <th>CRI</th> <th>80+</th> <th>90+</th> <th>80+</th> <th>90+</th> <th>80+</th> <th>90+</th> <th>80+</th> <th>90+</th> </tr> </thead> <tbody> <tr> <td>CCT MULTIPLIER FOR LUMEN OUTPUT</td> <td>0.96</td> <td>0.81</td> <td>1.00</td> <td>0.85</td> <td>1.03</td> <td>0.88</td> <td>1.06</td> <td>0.91</td> </tr> </tbody> </table>		CCT	2700K	3000K	3500K	4000K	CRI	80+	90+	80+	90+	80+	90+	80+	90+	CCT MULTIPLIER FOR LUMEN OUTPUT	0.96	0.81	1.00	0.85	1.03	0.88	1.06
CCT	2700K	3000K	3500K	4000K																				
CRI	80+	90+	80+	90+	80+	90+	80+	90+																
CCT MULTIPLIER FOR LUMEN OUTPUT	0.96	0.81	1.00	0.85	1.03	0.88	1.06	0.91																
CRI	80	80 CRI																						
	90	90 CRI																						
OPTIC & LM MULTIPLIER SEE PAGE 3	15C ¹	15° reflector with clear lens	(0.95)																					
	20C	20° reflector with clear lens	(0.97)																					
	25C	25° reflector with clear lens	(0.97)																					
	40C	40° reflector with clear lens	(0.96)																					
	55C	55° reflector with clear lens	(0.95)																					
	40D	40° reflector with diffused lens	(0.93)																					
	45D	45° reflector with diffused lens	(0.92)																					
	50D	50° reflector with diffused lens	(0.92)																					
	60D	60° reflector with diffused lens	(0.93)																					
ACCESSORY SEE PAGE 3	HCL ²	honeycomb louver																						
Attached to bezel																								
BEZEL LENS SEE PAGE 3	NL ^{3,4}	no lens	(1.00)																					
TRIM COLOR SEE PAGE 3	BK	black																						
	WH	white																						
	MC	matte chrome																						
	BZ	bronze																						
	WT	wheat																						
Not applicable to trimless option. Do not include in trimless ordering code.																								
BEZEL COLOR SEE PAGE 3	BK	black																						
	WH	white																						
	MC	matte chrome																						
	BZ	bronze																						
	WT	wheat																						

15°- 60° BEAM ORDERING CODE

MOUNTING OPTIONS SEE PAGE 5, 6	NC	new construction with ceiling fitting plate
	IC ⁵	insulation contact housing
	RET	retrofit, no ceiling fitting plate
VOLTAGE	120	120V
	UNV	120V-277V
DIMMING	ELV1 ⁶	leading & trailing edge (Triac/ELV) dimming to 1%
	DIM10	0-10V dimming to 1%
ELECTRICAL OPTIONS	EM7	emergency battery backup, 90 minutes at 7W to LED
	EM12	emergency battery backup, 90 minutes at 12W to LED
	EM10CA20	remote emergency battery backup, 90 minutes at 10W to LED, CA title 20

ADDITIONAL MOUNTING INFO

New Construction Bar Hangers (included)	Mounting Length: 14-3/4" to 26"
Extension Kit p/n: K20266 (ordered separately, 1 per fixture)	Extends a pair of Bar Hangers Total Mounting Length: 29" to 48"

YOUR COMPLETED ORDERING CODE

Follow the steps to specify your fixture, example:
NU3 - RDLP - SW - 20LM - 30K - 90 - 20C - WH - WH - NC - DIM10

NOTES

- 15C available in 10LM/15LM/20LM.
- HCL not available with lens. Multiplier: Delivered Lumens (0.78) / Beam Spread (0.80).
- NL option does not meet requirement for AT/DF/WET/NSF listings.
- NL option available for 15C/20C/25C/40C/55C.
- IC not available in 15C/20LM or 30LM.
- ELV1 dimming available in 120V.

alphabet

PROJECT INFORMATION		
JOB NAME		TYPE
ORDERING CODE		

TRIM OPTIONS

TRIM/BEZEL COLORS



WH



MC



BK



BZ



WT

OPTICAL OPTIONS

- UGR calculation based on CIE 117-1995; room size: 4H X 8H, reflectance: 70/50/20;
- UGR calculation based on 15LM fixtures, unless otherwise noted.

CL

Clear Lens



OPTIC	BEAM ANGLE	UGR
15C	14.4	17
20C	22	16.5
25C	26	16.6
40C	39	17.5
55C	56	18.2

DL

Diffused Lens



OPTIC	BEAM ANGLE	UGR
40D	40	20.7
45D	45	21.2
50D	51.7	21.8
60D	59	22.5

ACCESSORY

Honeycomb Louver



OPTIC	BEAM ANGLE	UGR
15	11.5	≤5
20	16	≤5
25	20	≤5
40	32	≤5
55	44	≤5

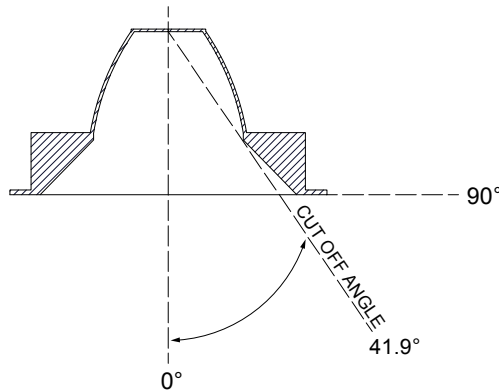
GLARE CONTROL

CUT-OFF ANGLE

Visual comfort is achieved with a lower cut-off angle due to improved glare control. The smaller the cut-off angle, the easier it is on the eye.

Alphabet downlights have been thoughtfully engineered to eliminate glare while still delivering functional illumination.

- Cutoff angle is 41.9° degrees;



alphabet

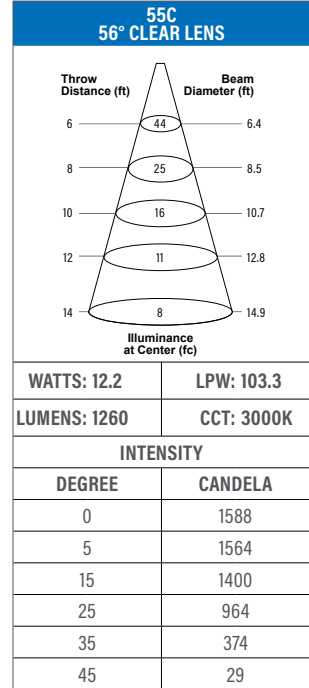
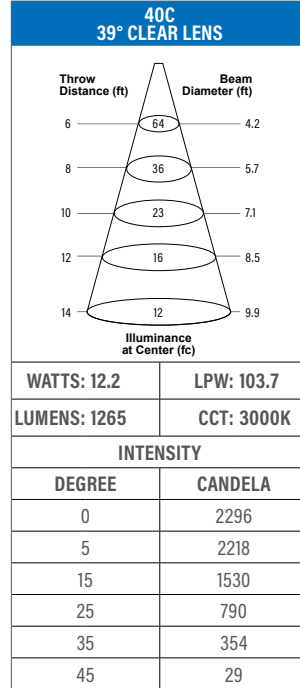
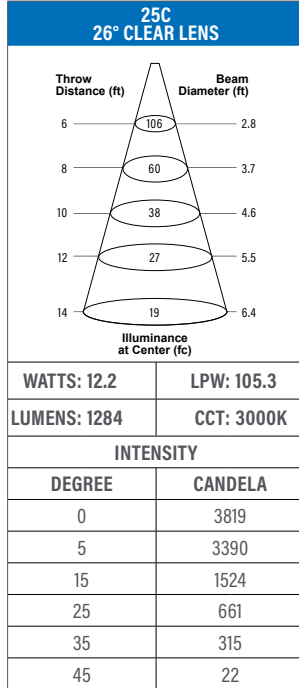
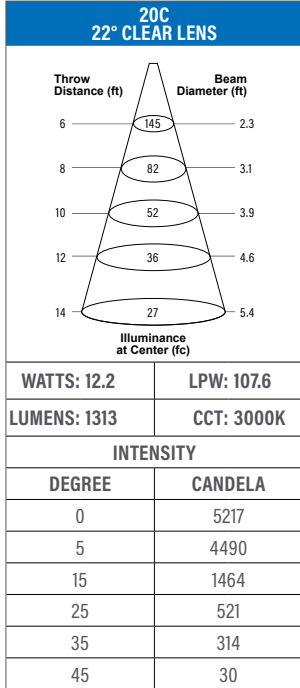
PROJECT INFORMATION		
JOB NAME		TYPE
ORDERING CODE		

PHOTOMETRIC DATA

15LM CCT MULTIPLIERS

	80 CRI	90CRI
2700K	0.96	0.81
3000K	1	0.84
3500K	1.01	0.85
4000K	1.03	0.87

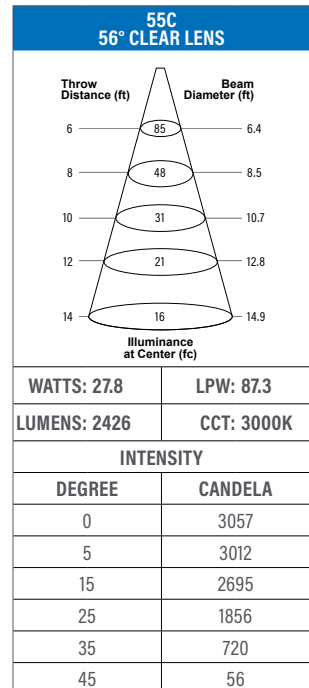
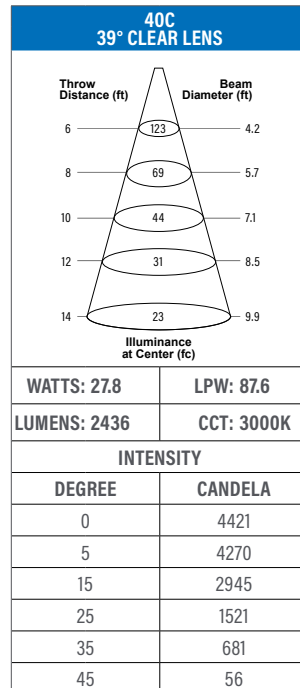
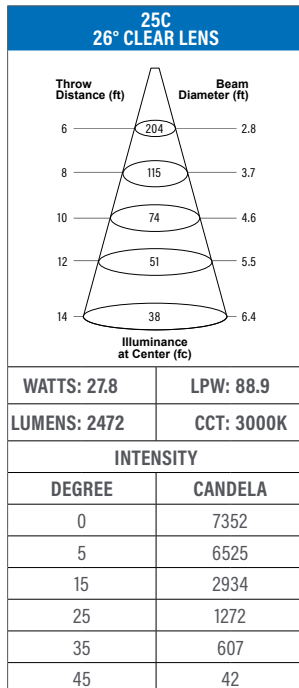
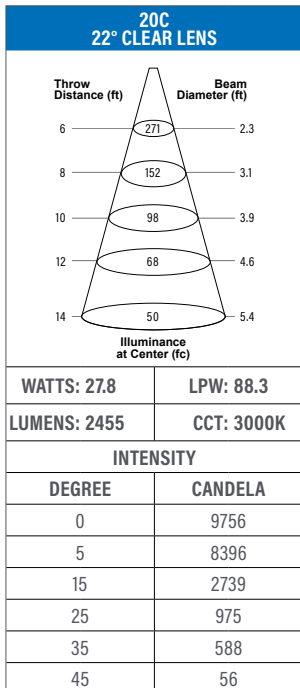
FC Formula = CBCP / Distance²



30LM CCT MULTIPLIERS

	80 CRI	90CRI
2700K	0.96	0.81
3000K	1	0.84
3500K	1.01	0.85
4000K	1.03	0.87

FC Formula = CBCP / Distance²

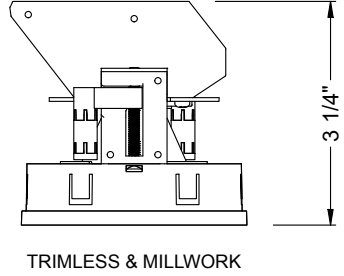
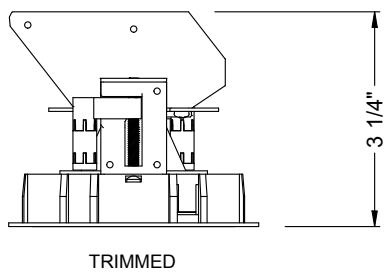


alphabet

PROJECT INFORMATION		
JOB NAME		TYPE
ORDERING CODE		

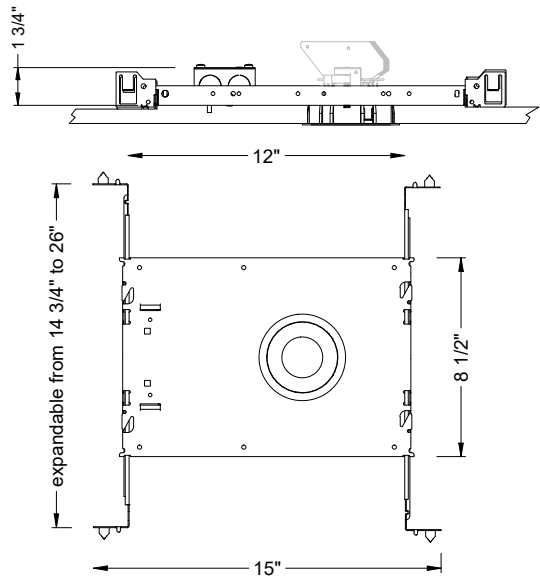
MOUNTING OPTIONS

FIXTURE HEIGHT

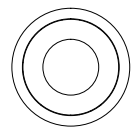


NC - NEW CONSTRUCTION

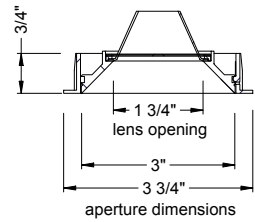
TRIM



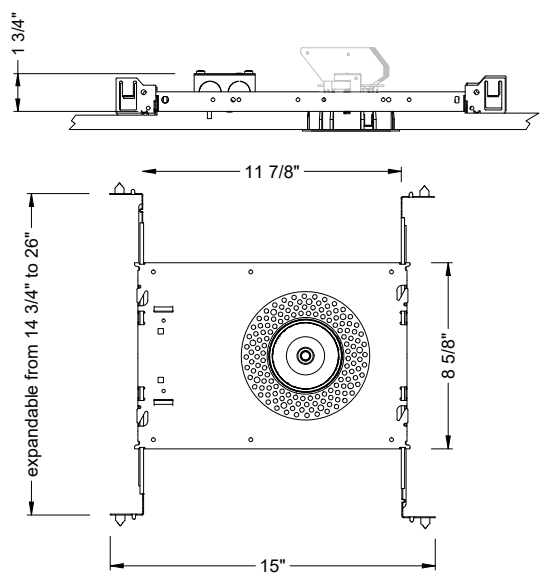
TRIM



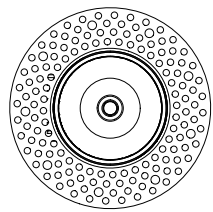
ceiling cutout
3-3/8" diameter
ceiling thickness
1/8" to 1-5/8"



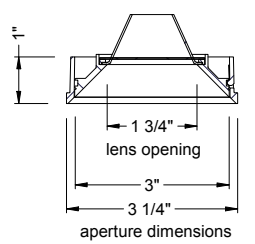
TRIMLESS



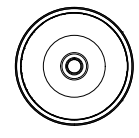
TRIMLESS



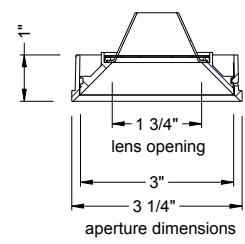
ceiling cutout
3-1/2" diameter



TRIMLESS/MILLWORK



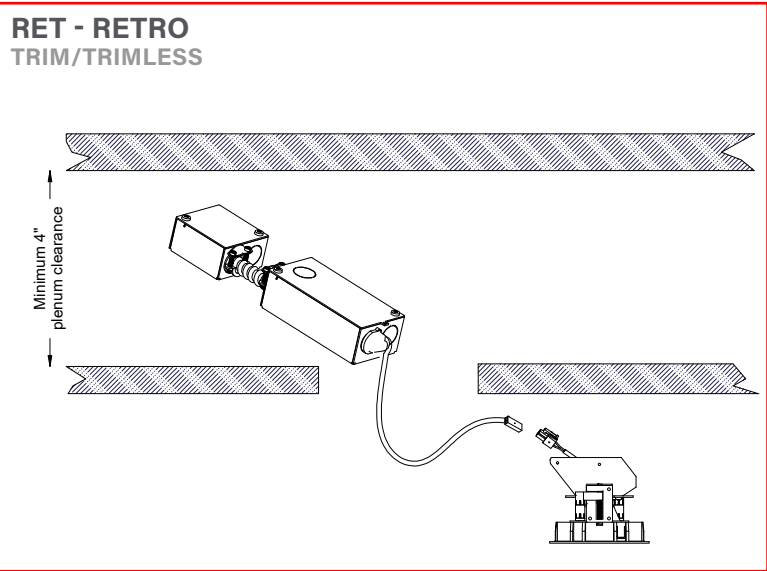
ceiling cutout
3-1/2" diameter
ceiling thickness
3/8" to 1-3/4"



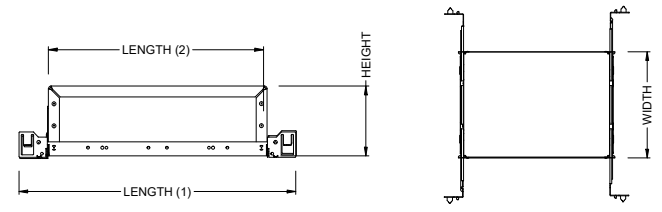
PROJECT INFORMATION		
JOB NAME		TYPE
ORDERING CODE		

MOUNTING OPTIONS (CONTINUED)

RET - RETRO TRIM/TRIMLESS



IC - INSULATION CONTACT HOUSING



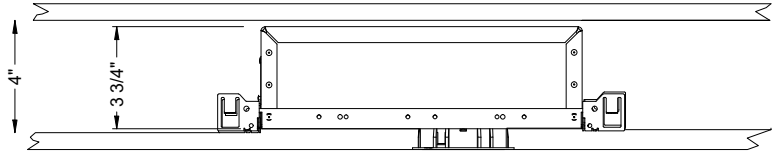
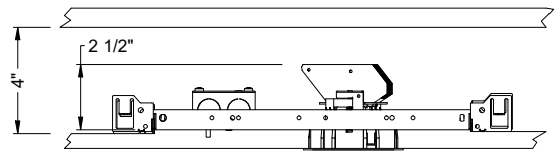
BOX SIZE	L 1	L 2	W	H
A	15 - 7/16"	11 - 3/4"	8 - 1/2"	3 - 3/4"

RATINGS / CERTIFICATIONS	NC	RET
TYPE NON-IC	✓	✓
SUITABLE FOR AIR HANDLING PLENUMS	✓	✓
REDUCED AIRFLOW (WITH LENS) ASTM E283	✓	✓

BOX TYPE / LUMEN OUTPUT - STANDARD BEAMS (15°)	
LUMEN OUTPUT	BOX - A
	IC
10LM	✓
15LM	✓
20LM	

CEILING THICKNESS	
FIXTURE TYPE	MOUNTING TYPE
	STANDARD CEILING THICKNESS
TRIM	1/8" to 1-1/4"
TRIMLESS	3/8" to 1 - 3/4"
MILLWORK (TRIMLESS)	1/2" to 1 - 3/4"

BOX TYPE / LUMEN OUTPUT - STANDARD BEAMS (20° - 60)	
LUMEN OUTPUT	BOX - A
	IC
10LM	✓
15LM	✓
20LM	✓
25LM	✓
30LM	



PROJECT INFORMATION		
JOB NAME		TYPE
ORDERING CODE		

BATTERY OPTIONS

EMERGENCY BATTERY

IOTA's ILB Battery Backups are UL Listed LED emergency drivers that allow the same LED fixture to be used for both normal and emergency operation. In the event of a power failure, the ILB switches to the emergency mode and operates the existing fixture for 90 minutes. The unit contains a battery, charger, and converter circuit in a single can. The Constant Power design of the ILB maintains the output wattage to the LED array even as the system voltage diminishes. UL 924 Listed for U.S. and Canada. UL 1310 Certified, Output Class 2 Compliant. Includes single-piece TBTS test switch and charge indicator accessory kit. For use with switched and unswitched electric fixtures, and includes Two-wire universal AC input. Meets or exceeds all National Electric Code and Life Safety Code Emergency Lighting Requirements. Rated for use in Plenum, Damp Location, Recessed Type IC, and Enclosed and Gasketed Luminares.

REMOTE TEST SWITCH

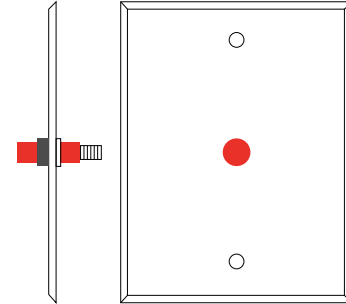
The Remote Test Switch may be mounted adjacent to the LED Fixture by others.

EMERGENCY BATTERY ACCESS

Above ceiling access is required for service. An access panel in the ceiling (or other form of access) adjacent to the installation location of the Emergency Battery is required.

REMOTE LOCATION

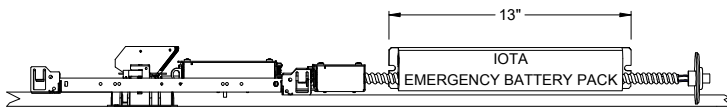
Maximum remote mounting distance of the emergency driver shall be 50 feet. Remote location wiring provided by others. Follow all Local and National Electric/Building Codes.



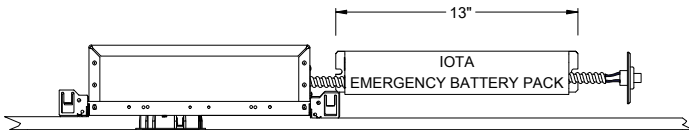
Remote Test Switch

EM MODE OUTPUT (DELIVERED LUMENS)			
LUMEN ORDERING CODE	EM7	EM10	EM12
ALL OPTIONS (10LM TO 30LM)	684LM	992LM	1190LM
Notes: Based on 30K, 80CRI			

NC - NEW CONSTRUCTION WITH EM BATTERY (REMOTE TEST SWITCH)

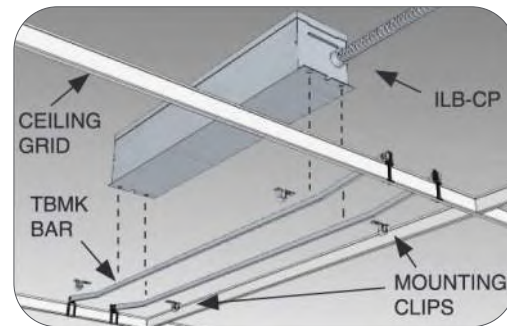


IC - INSULATION CONTACT HOUSING WITH EM BATTERY (REMOTE TEST SWITCH)



Accessory

76066 Optional T-Grid Mounting Kit¹



1. Can be used with any of the Emergency Battery Backups. Must be ordered as a separate line item.

CONTINUOUS STRING LIGHT, BLACK FINISH, RGBW SOURCE, CUSTOM SPACING TO MATCH EXISTING. VERIFY LENGTHS WITH FIELD CONDITIONS, POLYCARBONATE S14 LENS ACCESSORY. PROVIDE MOUNTING CLIPS, CONNECTORS, AND ALL COMPONENTS FOR A FULLY FUNCTIONAL SYSTEM. REMOTE POWER SUPPLY. CONNECT TO CODE-COMPLIANT AUTOMATIC LIGHTING CONTROL FOR ON/OFF.

PROVIDE COMPATIBLE DMX CONTROLLER AND DECODER FOR COLOR-CHANGING FUNCTIONS. COORDINATE LOCATIONS WITH OWNER/ARCHITECT.



Black



White

Description

Individually addressable LED pixel light string with individually addressable RGBW dots

Features

- Individually addressable LED pixel dots
- 16-bit color resolution with DMX512 control
- 6 RGB SMD LEDs + 3 White SMD LEDs per dot
- Polycarbonate lens accessories available in 3 styles
- Light weight aluminum housing with acrylic lens standard
- Custom spacing on UL94V-0 cable
- Anti-UV, VO flame retardant coating
- Class III electrical safety level

Mounting

Clips or track available

Applications

Point light source, curtain walls, 3D shapes

Technical Information



CCT	RGBW
Input Voltage Range	24V DC
Max Power	1.8W per dot
Power Factor	0.8
Max Power Linking	Dependent on controller + driver
Max Signal Linking	Dependent on controller + driver
Max Lumens	60 per dot
Protocol	DMX IC SM16512
Resolution	Each dot individually addressable
Refresh Rate	>1000Hz
Beam Angle	120°
Net Weight	35g (0.077Lbs)
Operating Temp	-35°C (-31°F) ~ 60° (140°F)
Storage Temp	-40°C (-40°F) ~ 70° (158°F)
Operating Humidity	10-90%
IP Grade	IP67
Safety Rating	cETLus Listed; Wet locations; CE; RoHS
Rated Life	80,000 Hours (operating temperature <50°C)

Special Order Information

Please allow 12-16 weeks for special order items

LINE	SERIES	TYPE	DOTS PER STRING	Dot Spacing (in)	Lead Length (in)	Tail Length (in)	Wire Color
PZM	DOT	PXL-RGBW	VERIFY WITH FIELD CONDITIONS Recommended 50 or less per string*	MATCH EXISTING 75mm Minimum pitch	BY EC	BY EC	BK
		RGBW = RGBW					WH = White BK = Black

*Recommended 32.8ft (10M) or less string length when using pitch >200mm

Can be powered from both ends and/or used with a t-connector (PZM-PXL-TCON) for reinjecting power to achieve longer runs. See below for general pitch advisements. Contact a Prizm representative for more accurate layout advisement.

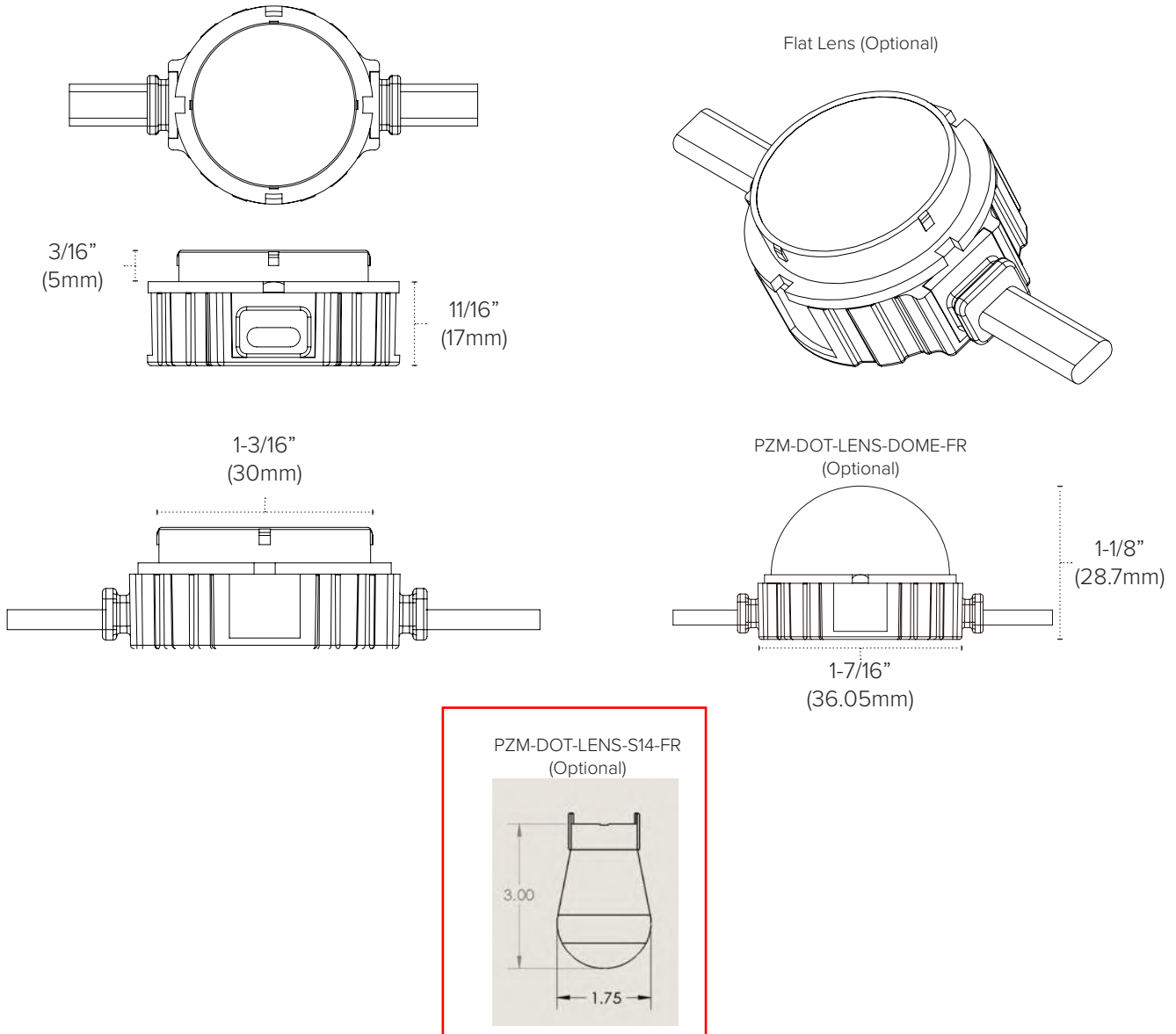
101.6MM	about 60dots
152.4MM	about 55dots
203.2MM	about 50dots
304.8MM	about 40dots
457.2MM	about 30dots
609.6MM	about 20dots

Additional mounting and connection accessories may be required dependent on design and layout
Pixel Dot is available as special order only. For special orders, please contact us at: Quotes@PrizmLighting.com

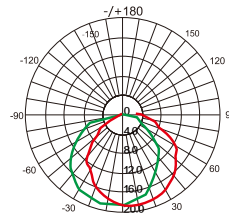
Quick-Ship & Accessory Order Information

FIXTURE	ITEM NUMBER
4" on center, 50 nodes, 36" lead & no tail, WHITE, not interconnectable	PZM-DOT-PXL-RGBW-50-4-36-0-WH
12" on center, 25 nodes, 36" lead & no tail, WHITE, not interconnectable	PZM-DOT-PXL-RGBW-25-12-36-0-WH
4" on center, 50 nodes, 36" lead & no tail, BLACK, not interconnectable	PZM-DOT-PXL-RGBW-50-4-36-0-BK
12" on center, 25 nodes, 36" lead & no tail, BLACK, not interconnectable	PZM-DOT-PXL-RGBW-25-12-36-0-BK
ACCESSORY	ITEM NUMBER
Frosted Flat polycarbonate lens for Pixel Dots (clips on to the housing)	PZM-DOT-LENS-FLAT-FR
Frosted S14 polycarbonate Lens Clip & Bulb for Pixel Dots (3" M.O.L")	PZM-DOT-LENS-S14-FR
Frosted Dome polycarbonate lens for Pixel Dots (molded on to the housing at factory)	PZM-DOT-LENS-DOME-FR
Plastic Mounting Clips for Prizm Pixel Dot	PZM-DOT-CLIP
15FT 16#AWG Connection cable with female connector	PZM-PXL-CONKIT-15
12 inch Jumper Cable, male and female connector	PZM-PXL-JUMP12IN
SPECIAL ORDER ONLY (Please allow 12-16 weeks for special order items)	ITEM NUMBER
T-Connector Power/signal cable	PZM-PXL-TCON
End connector, waterproof for last lighting	PZM-PXL-END
12in Jumper Cable, male and female connector	PZM-PXL-JUMP12IN
24in Jumper Cable, male and female connector	PZM-PXL-JUMP24IN
36in Jumper Cable, male and female connector	PZM-PXL-JUMP36IN

Physical Dimensions



Additional Information



Illumination Icon

Height (m)	Average Illumination (lx)	Diameter (cm)
1m	5,408.18.65	298.19
2m	1,352.4.663	596.39
3m	0.6009.2.072	894.58
4m	0.3380.1.166	1192.78
5m	0.2163.0.7455	1490.97

Height (m) | Average Illumination (lx) | Diameter (cm)

DMX WALL CONTROL

RGBW 4 Zone Wall Controller



Festoon Lighting Controller

Mastermind a dynamic lighting scheme with the sleek, easy to use in-wall DMX Wall Control. Featuring 16 mode auto play function, RGBW shortcuts for color mixing and brightness control, and four zone control coupled with DMX decoders and transceivers compatibility, wall control fits single gang junction boxes with convenient installation, readily enabling total lighting control, and full functionality.

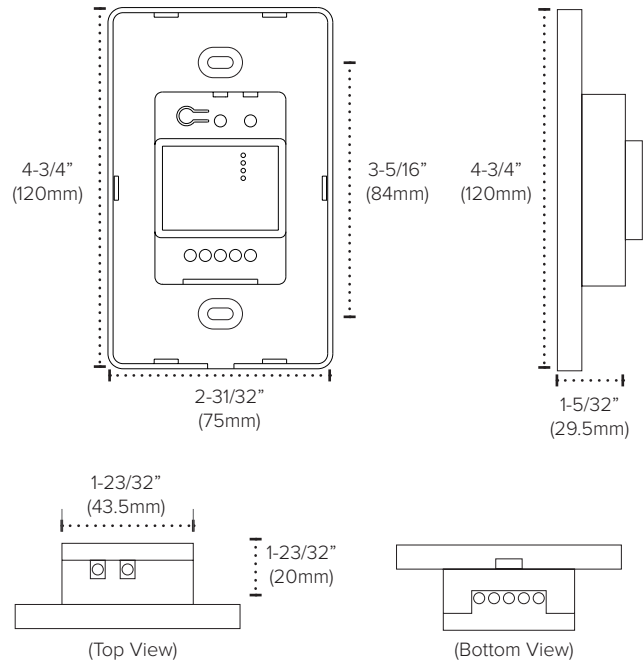
- Touch-sensitive configuration & operation
- Touch color circle with color tone shortcuts
- Includes selection of 4 zones with 4 savable scenes each
- Features full range dimming capabilities (1-100%)
- Requires 12-24V DC input and 4-channel DMX decoder



DMX WALL CONTROL QUICK SPECS

INPUT VOLTAGE	12-24V DC
POWER CONSUMPTION	200mA
OUTPUT	DMX 512 signal
OPERATING TEMP	-20°C to 55°C (-4°F to 131°F)
RATING	UL, FCC Compliant; RoHS Compliant; dry locations

DMX WALL CONTROL QUICK DIMENSIONS



DMX WALL CONTROL ORDERING INFORMATION

ITEM NUMBER	DESCRIPTION	VOLTAGE	OUTPUT	RATING
PZM-CTRLW-DMXB-RGBW-4Z	RGBW 4 Zone Wall Controller	12-24V DC	DMX 512	UL, FCC Compliant; RoHS Compliant; dry locations

RECOMMENDED DECODERS

PART NUMBER	DESCRIPTION	APPLICATION	INPUT	CURRENT	OUTPUT
REC-DMX-5A-4Z	DMX 4-Channel Decoder	Dry location	12-24V DC	4x5A	4x(60-180W)
REC-DMX-RJ45-5CH	DMX 5-Channel Decoder	Dry location	12-24V DC	5x8A	5x(96-192W)
REC-DMX-RJ45-3X4CH	DMX 3 Port 4-Channel Decoder	Dry location	12-24V DC	12(3x4)x5A	12x(60-120W)
DEC-DMX-IP67	DMX 4 Channel IP67 Decoder	Wet location	12-24V DC	4x5A	4x(60-180W)

Control can be powered from secondary side of 12-24V DC driver being used to power the decoder.

RECOMMENDED TRANSCEIVER

PART NUMBER	DESCRIPTION	APPLICATION	INPUT	LISTING
CTRL-WDMX-TRNRCV	Wireless DMX Transceiver	Dry location	5-24V DC	FCC Compliant; RoHS Compliant

DMX WALL CONTROL QUICK SET-UP



DMX Wall Control
RGBW 4 Zone Wall Controller



Power Supply/Driver



DMX Decoder
(Required per zone)



Tape Light

DMX WALL CONTROL QUICK SET-UP



DMX Wall Control
RGBW 4 Zone Wall Controller



Wireless DMX Transceiver
CTRL-WDMX-TRNRGV-X



Wireless DMX Transceiver
CTRL-WDMX-TRNRGV



Power Supply/Driver



DMX Decoder
(Required per zone)



Tape Light

RECOMMENDED 24V DC DRIVERS

PART NUMBER	DESCRIPTION	APPLICATION	INPUT	CURRENT	LISTING
LED-DR8-12	LED-DR Series Driver	Dry/damp location	12V DC	8W	cULus Recognized
LED-DR8-24	LED-DR Series Driver	Dry/damp location	24V DC	8W	cULus Recognized



PRIZM LIGHTING WARRANTY

5-YEAR LIMITED WARRANTY FOR LED PRODUCTS

Prizm Lighting, a division of American Lighting Inc, warrants to its customer and the original end user the LED electronics and components of its properly installed LED products, to be free of defects in material and workmanship, in normal use, for a period of five (5) years from the date of shipments by Prizm Lighting and warrants the painted finish for a period of one (1) year from the date of shipment by Prizm Lighting.

Painted finished on the product will be considered defective in material or workmanship only if there is substantial deterioration in the form of blistering, cracking, or peeling within the one (1) year warranty period. The painted finish is not warranted against fading or chalking, as it may naturally fade or chalk over time due to normal aging.

Prizm Lighting, a division of American Lighting Inc, at its sole option, will repair, replace, credit, or refund, any warranted product returned to it that it determines to be defective. Customer or consumer must return the product, transportation prepaid, to American Lighting Inc at 11775 E. 45th Ave, Denver, CO 80239 within the warranty period. No return of products will be accepted without a Return Goods Authorization (RGA) which may be obtained by calling 1-800-297-0484. This warranty excludes and there is disclaimed liability for labor or removal of this product or re-installation of this product or a replacement product. This warranty is void if the product is installed in violation of the National Electrical Code (NEC) or any applicable local electrical codes, or in an improper environment, misused, opened, abused, or altered in any manner, or is not used under normal operating conditions, or not in accordance with any labels or instructions. This warranty does not cover damages due to environmental conditions, acts of nature, animal or insect activity, or power surges.

THE ABOVE EXPRESS WARRANTY STATES THE FULL AND COMPLETE OBLIGATION OF PRIZM LIGHTING, A DIVISION OF AMERICAN LIGHTING INC. ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE TERM OF THE EXPRESS WARRANTY. UNDER NO CIRCUMSTANCES WILL PRIZM™ LIGHTING, A DIVISION OF AMERICAN LIGHTING INC, ACCEPT LIABILITY FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR INDIRECT DAMAGES, INCLUDING, WITHOUT LIMITATION, DAMAGE TO OR LOSS OF USE OF ANY EQUIPMENTS, LOST SALES OR PROFITS OR DELAY OR FAILURE TO PERFORM THIS WARRANTY OBLIGATION. THE REMEDIES PROVIDED HEREIN ARE THE EXCLUSIVE REMEDIES UNDER THIS WARRANTY, WHETHER ARISING OUT OF CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE.

Some states do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

No distributor or supplier of Prizm Lighting, a division of American Lighting Inc, has the authority to modify or amend this Limited Warranty. This warranty may not be transferred or assigned by the original end user.

AVERAGE LIFE

For LEDs, the hours of rated life specify the point where 70% of original lumen output is reached. Below this point, the effective life is over, however, the LED may still emit light. Individual results may vary with actual environmental conditions including, but not limited to, proper installation, ambient temperature and/or input voltage fluctuations.

For all linear lighting categories, any non-rated field connection made in an outdoor application should be properly sealed with dielectric grease covering all conductive materials; and properly installed power connections and end caps, sealed with silicone and heat shrink tube.

For the latest product information, updates, instructions and details concerning specifications, colors, finishes, performance, installation and design, visit www.prizmlighting.com. Color may vary from the color printed herein due to limitations in photographic and printing processes. American Lighting Inc. reserves the right to change product specifications without notice. Other product specifications such as color temperature, wavelength characteristics and lumen output are subject to production limitations and may vary.

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IP67 DMX DECODER

12V-36V DC DMX Decoder

The IP67 DMX Decoder allows for pixel addressing or sequencing pixel tape light. Pair with DMX controllers or compatible DMX software programs to create dynamic and unique chasing or color fading effects by addressing individual pixels.

- Standard DMX512 compliant control interface
- Digital numeric display
- 8 Bit or 16 bit PWM output resolution ratio
- Includes 2 waterproof junction boxes for wire connections
- IP67 Outdoor Rated
- RoHS Compliant
- 5 Year Warranty



IP67 DMX DECODER QUICK SPECS

SERIES	PZM-DEC-DMX-IP67
INPUT VOLTAGE	12-36V DC
INPUT CURRENT	20.5A
OUTPUT VOLTAGE	4X(12-36)V DC
OUTPUT CURRENT	4x5A
MAX LOAD	4x(60-180)W
INPUT WIRE	5" 18AWG
OUTPUT WIRE	5" 20AWG
DIMENSIONS	7-1/8"L x 2-7/8"W x 1-1/2"H
RATING	IP67 (Wet Location), RoHS Compliant
OPERATING TEMP	-4°F to 122°F (-20°C - +50°C)

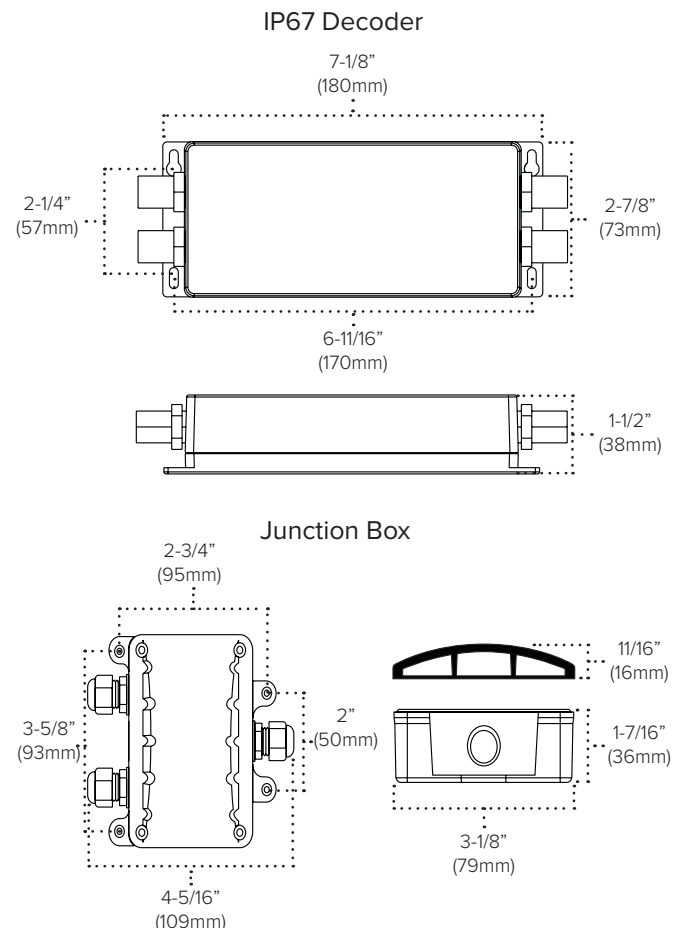
IP67 DMX DECODER ORDERING INFORMATION

ITEM NUMBER	DESCRIPTION
PZM-DEC-DMX-IP67	12-36V DC IP67 DMX512 Decoder

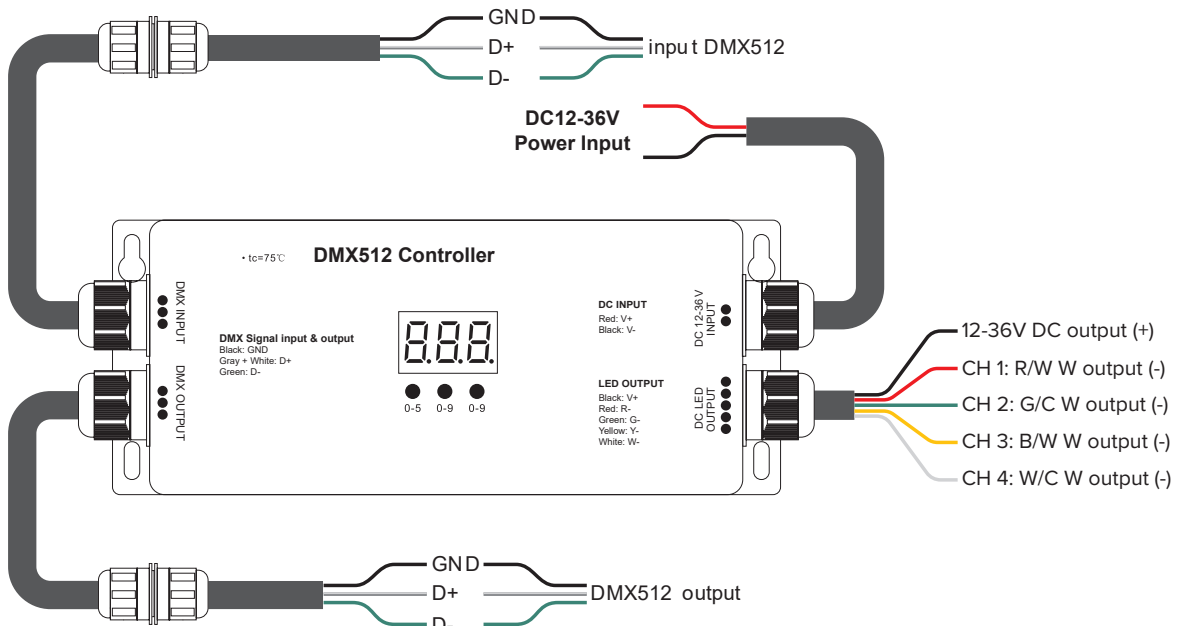
IP67 DMX DECODER ACCESSORIES

ITEM NUMBER	DESCRIPTION
PZM-DEC-DMX-IP67-JUMP10	10 meter male/female IP67 signal jumper cable

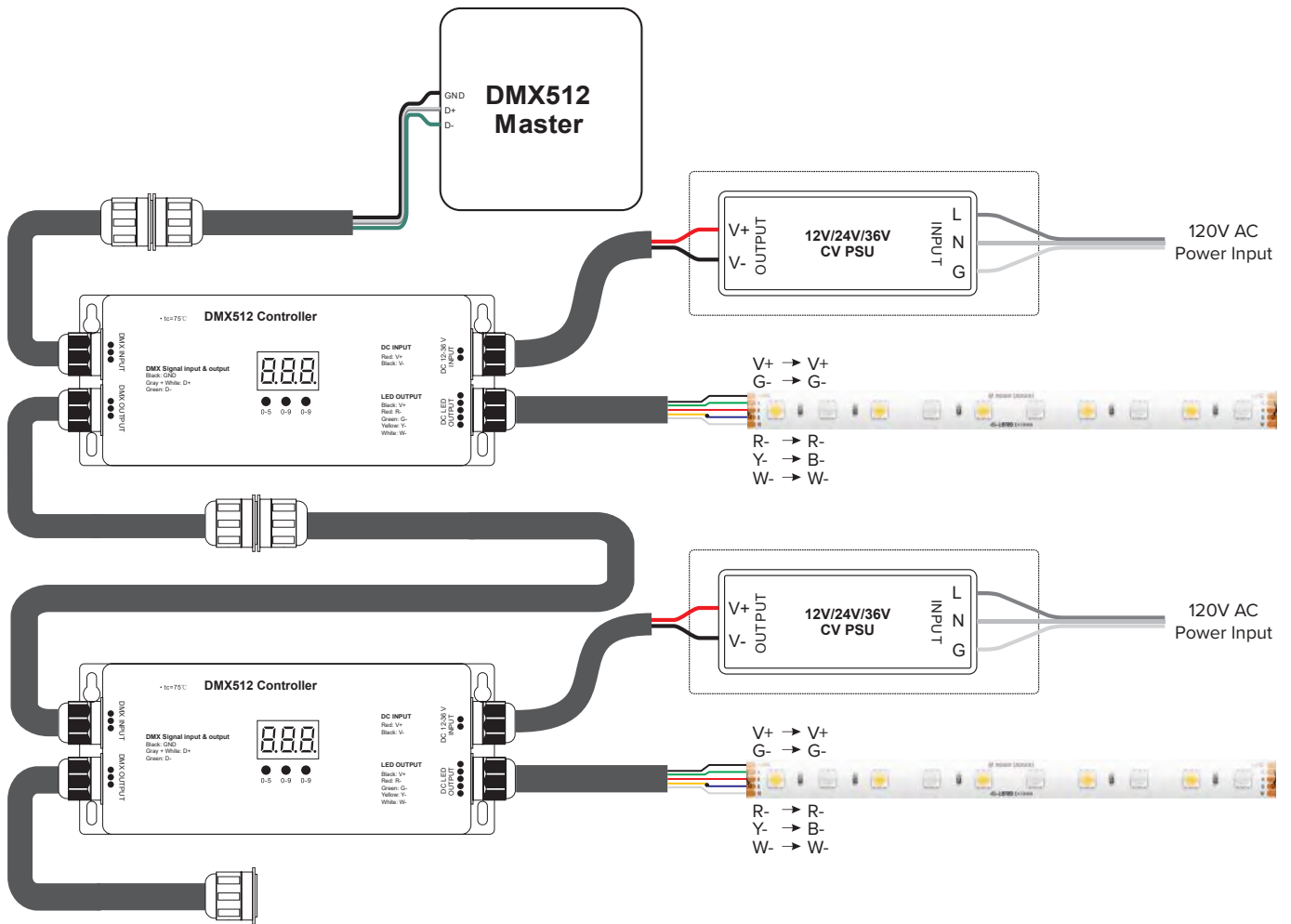
IP67 DMX DECODER QUICK DIMENSIONS



IP67 DMX DECODER PORTS INFO



IP67 DMX DECODER WIRING DIAGRAM





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Festoon Lighting Power Supply



Description

Class 2 constant voltage driver in either 12V DC or 24V DC outputs

Features

- 12V or 24V DC constant voltage hardwire driver; 60W capacity
- Non-dimmable on primary side; Utilize secondary side for Prizm controls or PWM dimming
- Universal AC input / Full Range
- Protections: Short Circuit / Overload / Over Voltage
- Built-in constant current limiting circuit
- Fully isolated plastic case; Fully encapsulated with IP67 level
- Class 2, Class II (no FG)
- Input via 22" 18AWG conductors
- Output via 22" 16AWG conductors

Mounting

Set upon flat surface or house in an enclosure

Applications

Suitable for LED lighting

Warranty

2 years

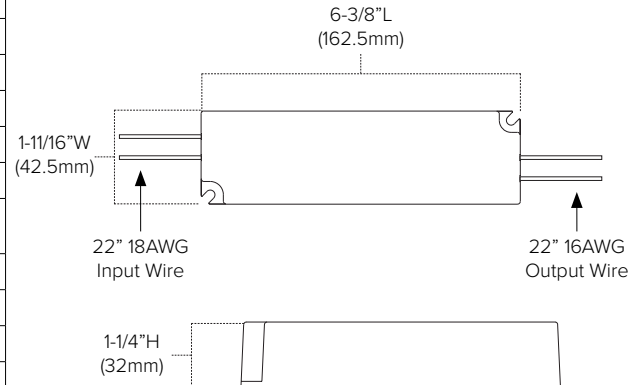
Technical Information



Model	LED-DR60-12	LED-DR60-24
Output DC Voltage	12V DC	24V DC
Rated Current	5A	2.5A
Maximum Load	60W (non-dimming); 57W (dimming*)	
Minimum Load	12W (non-dimming); 1W (dimming*)	
Input Voltage Range	100-240V AC (1.2A)	
Frequency Range	50/60Hz	
Efficiency	83%	86%
Dimming	Non-dimmable on primary side; Utilize secondary side for Prizm controls or PWM dimming*	
Overload Protect	Hiccup mode, recovers automatically after fault condition is removed	
Over Voltage Protect	Shut down o/p voltage, re-power on to recover	
Operating Temp	-22°F to 158°F (-30°C to 70°C)	
Operating Humidity	20 ~ 90% RH non-condensing	
Rating	Class 2; cULus for dry and damp locations; RoHS Compliant	

*Utilize Prizm controller + receiver combo on secondary side (sold separately); PWM dimming will consume ±3W internally

Dimensions



Ordering Information

LED-DR60
Driver



LED-DR60-12 includes:

(1) 12V DC Constant Voltage Power Supply

LED-DR60-24 includes:

(1) 24V DC Constant Voltage Power Supply

Example Part # LED-DR60-12

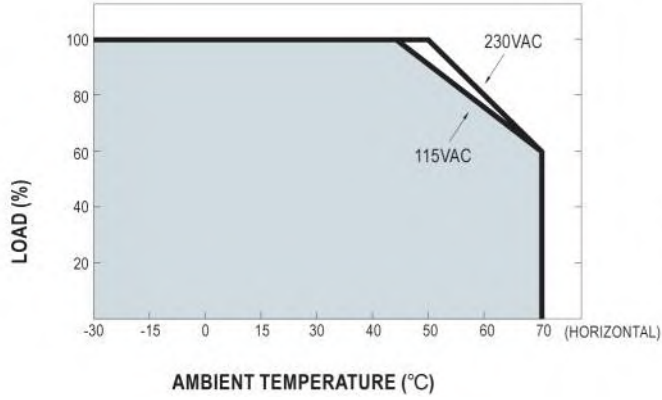


Accessories

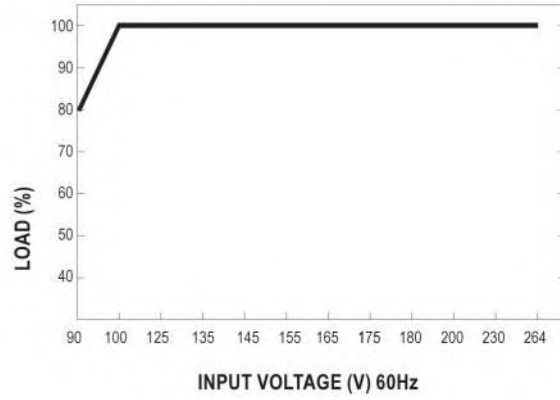
Image	Part Number	Description
	ENCL-11	Galvanized steel wiring enclosure; 11-1/2" L x 1-7/8" W x 1-3/4" H

Additional Information

■ Derating Curve



■ Static Characteristics



NOTES

Tabor Opera House
West Elevation Sheet Metal Cornice
Forensic Report
Andy Carlson, Heritage A&M
8.26.21

Overview

The Tabor Opera House is a brick masonry building approximately 60' tall on its west elevation, the street-facing façade. At the top of this facade, the Opera House features a sheet metal cornice approximately 50" feet high and extending 32" out from the wall face. The cornice includes 4 large corbels, located at its two ends and at the ends of a 12-foot long bump out in the middle of the building. The central bump out extends approximately 18" from the main wall face, pushing out the sheet metal cornice a corresponding distance and giving it two outside corners. The cornice also includes multiple smaller corbels and a dentil course between the 4 large corbels, along with a variety of other profile details.



The Tabor Opera House, west elevation

Over the summer of 2021, a scaffold was erected on the west elevation of the Opera House to perform masonry and window restoration. Available project funds did not allow the sheet metal cornice to be restored at this time, but the access the scaffold provided allowed the cornice to be examined more closely than previously possible. From this vantage point, even a cursory examination of the cornice revealed at least two major forms of failure.

The first obvious failure is that the bottom edge of the cornice is extremely wavy in the vertical dimension, rising and falling by as much as 2" over the length of the cornice, and especially across the north and south sections of the main wall face (the two sections, that is, which are separated by the central bump out). This irregularity would appear to correspond directly to a settling that has occurred in the masonry, and which runs all the way up and down the height of the building, ultimately tracing back to the failure of 4 timber column bases that help to support the wall. These column bases are being stabilized as part of the 2021 work, which it is hoped—together with a 100% repair and repointing of the west masonry wall—will forestall any future disfigurement of the sheet metal cornice in this direction; more on the column stabilization efforts below.



Waviness of the cornice bottom plate and consequent irregularity of top visible row of bricks

Of greater immediate concern is the second obvious form of failure, which is that the entire cornice, and particularly the four large corbels, has pitched forward and downward over time, opening up some major gaps at the sheet metal seams and giving the appearance that, if this sagging continues, some sort of catastrophic failure of the cornice could be possible. This form of failure is particularly evident in the central bump out section of the cornice.



Cornice bulging and pitching forward, particularly at the central bump out.

In multiple locations, heavy-duty baling wire has been used to tie the sheet metal panels back to the building. The wire is coated with the same paint as the larger cornice, and its placement is rather haphazard, suggesting that the cornice began failing many decades ago, and that previous attempts—albeit of a rather DIY nature—have been made to arrest the sagging of its sheet metal cladding.



Baling wire repairs

In July of 2021, with the scaffolding still in place, A&M Renovations, LLC was commissioned to conduct a forensic investigation of the cornice to determine, 1) how the cornice was constructed, and particularly the details of its internal framing, 2) the nature and cause of the cornice's evident failures, and 3) how these failures might best be most effectively addressed, whether in the short or long term.

On August 5 and 6, 2021, Andy Carlson of A&M performed an onsite investigation of the Tabor Opera House cornice, accessing it both from the building exterior, from the scaffold, and from the building's attic. The results of this investigation follow.

Cornice Construction

The west wall of the Tabor Opera House is composed of brick masonry 3 wythes thick at the base of the sheet metal cornice. A horizontal 2x4 (presumably Douglas fir) takes the place of one course of bricks in the wall's outer wythe; this serves as a base plate for the framing of the lower portion of the cornice. The brick wall then resumes on top of this base plate, extending up approximately another 3 feet. Vertical 2x4's are let into this section of brick of wall with a spacing of 36" on center, providing attachment points for the lower portion of the cornice's metal cladding, which remains more or less flush to the brick wall. This lower portion of cornice framing was observed from the building exterior by peeling back a large sheet metal panel on the north section of the main wall.



Lower cornice framing, with vertical 2x4's let into brick wall

A much better view of the framing of the cornice's upper portion, which juts out from the wall face, was obtained from the building's attic. The exterior brick wall, which narrows to 2 brick wythes thick at the upper section of the cornice, provides bearing for several beams supporting the roof framing, but it stops at the base of these beams, allowing for a view out to cornice between the beams. This gap has been covered with a patchwork of plywood and insulation to reduce air infiltration, but this covering is easily removed. Furthermore, several additional courses of brick were previously removed from a 2' section of the upper wall in the central bump out area, yielding a particularly good view of the cornice framing in this location. This was the primary viewpoint from which the investigation of the upper cornice framing was conducted.



Upper cornice framing details



More upper cornice framing details, including diagonal attachment to ceiling joists below

A diagram of the upper cornice framing is attached at the end of this report, but three points bear special mention.

- 1) In a typical sheet metal cornice from this period, either the roof joists cantilever out from the building to provide the backbone of the cornice framing, or else joist-like outriggers extend back into the building, where they are sistered to the actual roof joists. In the case of the Opera House cornice, however, no horizontal framing members extend back into the building; the cornice, rather, is essentially “surface mounted” onto the face of the masonry wall, creating a hinge point that renders the heavy cornice prone to tipping forward and downward. The only real connection between the cornice framing and building framing is provided by 1x diagonal supports, which tie the cornice framing to the third floor ceiling joists, located below the cornice.
- 2) A sheet metal cornice of this size is typically supported by framing members that are 2x6 or larger. In this case, however—with the exception of the vertical 2x4’s let into the masonry wall, which extend up to the top of the masonry wall, thus providing an attachment point for the upper cornice framing—most of the cornice framing is composed of 1x materials.
- 3) No framing, at all, was observed within 18” of the large corbel located at the north end of the central bump out. The framing (or lack of it) behind the three other large corbels could not be observed, but all are pitched forward and downward, suggesting that they are likely also lacking adequate framing.

Taking these points together, it seems clear the Tabor Opera House cornice was severely under-framed from the beginning. And doubtless, this has contributed to the cornice’s pitching forward over time. At the same time, however, the observations made of the upper cornice framing suggest it has held up surprisingly well over time. Contrary to initial expectations, in other words, it does not appear that the immediate cause of the cornice’s pitching forward either inadequate framing or deteriorating framing

are (with some likely exceptions, as in the case of the large corbels that have pitched forward in the absence of as framing support). Rather, the more immediate cause of cornice's visible pitching forward would appear to be a detachment of the metal cladding from the cornice framing. This form of failure is analyzed in greater detail below, following an analysis of the other major form of cornice failure observed.

Cornice Failure 1: Wavy Bottom Plate

As noted above, the west elevation of the Opera House features 4 major load-bearing columns, which flank 2 recessed entryways on either side of the central bump out. Prior to beginning work on the west elevation, the Project Team noted that the entire masonry wall had sagged 2-3" over these entryways, most notably producing deformations in the window sills above them, on both the second and third floors. When the masons began their work on the west elevation in the summer of 2021, starting at the top of the wall and working down, they observed that this sagging had telegraphed up even higher, all the way to the top of the visible masonry wall, upon which the bottom plate of the cornice rests. With the masons removing every brick on the west elevation and flipping them around before repointing, the decision was made to eliminate the visible sag in the outer wythe of bricks by running string lines and re-installing the brick courses in straight lines. Because, however, the bottom plate of the cornice framing is currently so wavy, and because the weight of the cornice prevented this bottom plate from being moved up or down at this time, the masons were forced to cut their top row of re-installed bricks to size, with the height of these bricks varying by as much as 2".

Also as part of the 2021 work, A&M Renovations has been replacing the 4 deteriorated column bases that caused the initial settling of the wall. The Project Team elected not to try to jack sunken portions of the wall back to their initial height, but rather to stabilize the wall in its current position, with the goal of preventing any further settling.

Taken together, the masonry work and the column stabilization have essentially locked the current waviness of the cornice bottom plate into place. From a structural standpoint, this would not appear to be problematic, since the wall beneath the cornice has now been stabilized. Aesthetically, moreover, the 2-3" of variation in the bottom of the cornice is not easily observed from street level, close to 55' below. Nevertheless, if the cornice is ever restored—which would include temporarily removing all of the sheet metal cladding—the top row of visible bricks should be re-laid, using whole bricks, which would restore the straight line of the cornice's bottom plate.

Cornice Failure 2: Cornice Pitching Forward

Given the obvious pitching forward of the cornice, the Project Team expected to find considerable deterioration of the cornice framing. Surprisingly, however, very little rot or other deterioration was discovered in either the lower or upper portions of the cornice framing. Some water staining could be observed in the 1x skip sheathing forming the roof deck above the cornice, so it is clear that some water infiltration has occurred over time. Nevertheless, this does not appear to have significantly affected the cornice framing, itself, suggesting a high degree of rot resistance in the old-growth Douglas fir used in the cornice's construction. By the same token, very few instances were observed of nails being pulled out and bent, framing members cracking, or other indications of framing failure. Thus, while the cornice was still clearly under-framed from the beginning, and while this has doubtless played some role in its pitching forward, its 1x framing would appear to have performed reasonably well over time.



Water stains on decking and roof members

With this in mind, it appears the main reason the cornice has pitched forward is not so much that the framing has failed, but rather that the sheet metal cladding has pulled away from the framing. Indeed, while precise measurements were difficult to obtain from inside the attic, it appears that gaps as large as 2" have opened up between the framing and metal cladding in the upper portion of the cornice. This conclusion is consistent with the prior attempts made at repairing the cornice: It appears someone recognized that the sheet metal was pulling away from the framing, and therefore tried to tie everything back using heavy baling wire. This form of failure is also somewhat predictable, given that—although some screws can now be observed in the sheet metal, likely the product of earlier repair attempts—historical practice suggests that when the sheet metal cladding was originally installed, it would have been attached to the framing entirely with nails, which are more prone to pull-out than screws.



Of course, to conclude that the observed failure of the cornice lies more with the attachment of the sheet metal cladding to the framing than with a failure of the framing, itself, does not absolve the inadequate design of the cornice framing of ultimate responsibility for this failure: Had the sheet metal had been given more and better attachment points, and particularly if it had been given more robust support at its crown, ideally in the form of some sort of outriggers tied back to the roof framing, the sheet metal presumably would not have been inclined to tip downward and pull away from its framing.

That said, the totality of these observations suggests that the cornice is actually in better shape than the Project Team initially feared. In any case, with the cornice framing having generally avoided severe deterioration, it does not appear that any sort of catastrophic failure is immanent. And while fully repairing and restoring the cornice will still be a major operation, it does not appear that this will require a wholesale replacement of the cornice framing. Rather, a restoration of the cornice could be accomplished through an augmentation of the existing framing, combined with a more robust means of re-attaching the sheet metal to the framing (i.e. screws rather than nails, combined with increased attachment points). And if budgetary considerations should render it impossible to schedule a complete restoration of the cornice anytime in the near future, it should not be difficult to provide a degree of augmentation of the cornice framing from the building's attic, which would provide additional insurance against any sort of catastrophic failure in the short term, as detailed immediately below.

Stabilization Strategy—Short Term

As noted above, some access to the upper portion of the cornice framing can be fairly easily obtained from the attic side by removing the plywood and insulation that have been used to cover the gap between the top of the brick wall (upon which the roof beams rest) and the roof decking (which sit on top of the roof beams). Making use of this gap, it should be possible to retrofit the cornice with some sort of outrigger, such as 2x6 LVL's, that attach to the roof joists on the attic side, while propping up the 1x framing on the cornice side. Given the limited access the gap provides to the cornice side, the propping up would doubtless require some improvisation on the part of the installation crew, such as by pre-attaching shims to the ends of outriggers as needed to support the outermost piece of 1x framing.

While this solution may be imperfect—it may be difficult, for instance, to mechanically attach the ends of the outriggers to the 1x framing—it should be adequate to arrest any further pitching forward of the cornice framing, and especially to prevent any sort of catastrophic framing failure for the foreseeable future.

Repair and Restoration Strategy—Long Term

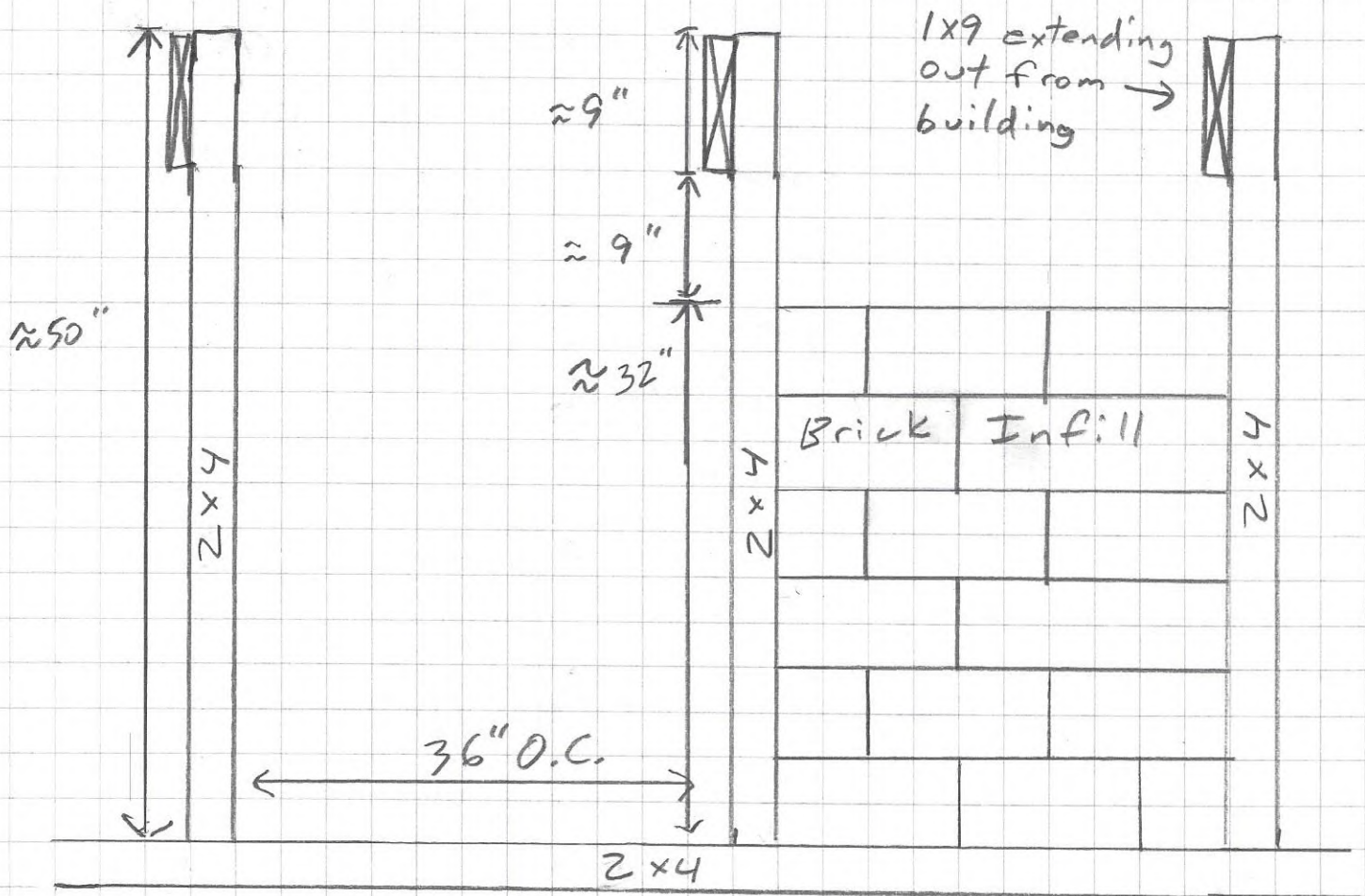
The proper repair and restoration of the cornice will require removing all of the existing sheet metal cladding, repairing it as necessary in a shop environment (to include reconstructing several missing cosmetic components), lifting the cornice framing enough to replace the top row of bricks beneath the bottom plate, repairing and augmenting the framing as specified by a structural engineer, then re-painting and re-installing the sheet metal cladding. This complete restoration of the cornice would provide numerous opportunities for improving its long term performance, such as increasing the number of attachment points for the metal cladding, substituting screws for nails in the attachment of the metal, and utilizing modern coatings and sealants.

In terms of project logistics, a scaffold could be erected to perform this work, but working from one or two boom lifts would likely be more efficient. At various times, this would require a full closure of the sidewalk in front of the Opera House, and the lift would need to be staged in the parking lane of Harrison Avenue, which would require a CDOT permit. That said, a fair amount of the framing augmentation could likely be performed from the attic side, reducing the amount of time required on the lift. As a rough estimate of the time required for the sidewalk and parking lane closures, it would likely take around 3 weeks to remove the metal cladding and repair/augment the cornice framing, during which time the sidewalk and parking lanes would need to be closed. There might then be some down time, when the sidewalk could be re-opened, as the metal cladding was restored, and possibly pre-painted, in the shop. Another 3 weeks of full closures would then be required for the re-installation of the metal cladding. If this work was performed in conjunction with the restoration of the building storefront, during which time much of the sidewalk would have to be closed, anyway, overhead protection could be provided for the workers at street level, and the total amount of time the sidewalk would have to be closed for the west elevation of the Opera House could be minimized.

It should also be noted that the cornice, along with the rest of the building, is covered by a membrane roof that is likely nearing the end of its lifetime. In an ideal scenario, replacement of the roof would be made to coincide with the cornice restoration, which would provide additional access to the cornice framing from the roof deck, while ensuring that the restored cornice was protected by a new roof. If this degree of coordination is not possible due to budgetary or scheduling factors, the roof could nonetheless be replaced in the immediate area of the cornice as the cornice is restored, with the bulk of the roof replacement being performed either before or after the cornice work.

Tabor Opera House

Cornice Framing - Front View



Brick Wall

All measurements are approximate. Not to scale.

A&M Renovations 9/21

Tabor Opera House

Cornice Framing - Side View

