

PROJECT MANUAL

Horseheads Central School District

District Wide Technology Upgrades

SED #: 07-09-01-06-7-999-002

Volume 2

The design of this project conforms to all applicable provisions of the New York State Uniform Fire Prevention and Building Code, the New York State Energy Conservation Code, and the building standards of the New York State Education Department



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Architect Set

Heading # 001

Number	Keypad	Location	Frame	Door	Size	Label	Hand	Qty	Type
BF-2			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL
BF-3			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL
RR-1			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL
RR-2			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL
RR-3			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL

Qty Act	Qty Inact	Description	Frame	Door	Size	Label	Hand	Mfgr	Qty	Type
3		4-1/2 Std Wt(.134) Hinge	TA2714	4-1/2"	x 4-1/2"	NRP	10	McKinney	100	
1		Storeroom Cylindrical Lever	9K3-7-D-15-D-S3			612		Stanley Security (Best)	300	
1		Wall Stop	3210T			US10		DCI	700	
3		Silencer	SR64			GRY		Ives	900	

Note

Architect Set

Heading # 002

Number	Keypad	Location	Frame	Door	Size	Label	Hand	Qty	Type
BF-1			HM	WD	3'-0" x 7'-0" x 1-3/4"	C45		1	SNGL

Qty Act	Qty Inact	Description	Frame	Door	Size	Label	Hand	Mfgr	Qty	Type
3	0	4-1/2 Std Wt(.134) Hinge	TA2714	4-1/2"	x 4-1/2"	NRP	10	McKinney	100	
1		Intruder Cylindrical Lever	9K3-7-IN-15-D-S3			612		Stanley Security (Best)	301	
1	0	Closer	351-O			EP		Sargent	500	
1	0	Wall Stop	3210T			US10		DCI	700	
3	0	Silencer	SR64			GRY		Ives	900	

Note

Architect Set

Heading # 003

Number	Keypad	Location	Frame	Door	Size	Label	Hand	Qty	Type
CS-1			HM	WD	3'-0" x 7'-0" x 1-3/4"	C45		1	SNGL

Qty Act	Qty Inact	Description	Frame	Door	Size	Label	Hand	Mfgr	Qty	Type
3	0	4-1/2 Std Wt(.134) Hinge	TA2714	4-1/2"	x 4-1/2"	NRP	10	McKinney	100	
1	0	Storeroom Cylindrical Lever	9K3-7-D-15-D-S3			612		Stanley Security (Best)	300	
1	0	Closer	351-O			EP		Sargent	500	
1	0	Wall Stop	3210T			US10		DCI	700	
3	0	Silencer	SR64			GRY		Ives	900	

Note

Architect Set

Heading # 004

Number	Keypad	Location	Frame	Door	Size	Label	Hand	Qty	Type
CS-2			HM	WD	6'-0" x 7'-0" x 1-3/4"	C45		1	PAIR

Qty Act	Qty Inact	Description	Frame	Door	Size	Label	Hand	Mfgr	Qty	Type
3	3	4-1/2 Std Wt(.134) Hinge	TA2714	4-1/2" x 4-1/2"	NRP	10		McKinney	100	
0	2	Flush Bolt, Corner, Manual	790F			US10		DCI	200	
1	0	Storeroom Cylindrical Lever	9K3-7-D-15-D-S3			612		Stanley Security (Best)	300	
1	0	Closer	351-O			EP		Sargent	500	
1	1	Wall Stop	3210T			US10		DCI	700	
1	1	Silencer	SR64			GRY		Ives	900	

Note

Architect Set

Heading # 005

Number	Keypad	Location	Frame	Door	Size	Label	Hand	Qty	Type
GR-1			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL
GR-2			HM	WD	3'-0" x 7'-0" x 1-3/4"	---		1	SNGL

Qty Act	Qty Inact	Description	Frame	Door	Size	Label	Hand	Mfgr	Qty	Type
3		4-1/2 Std Wt(.134) Hinge	TA2714	4-1/2" x 4-1/2"		26D		McKinney	101	
1		Storeroom Cylindrical Lever	9K3-7-D-15-D-S3			626		Stanley Security (Best)	302	
1		Wall Stop	3210T			US32D		DCI	701	
3		Silencer	SR64			GRY		Ives	901	

Note

SECTION 02 21 10
ASBESTOS ABATEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification Sections, drawings attached to this specification section, apply to the Work of this section.
- B. Laboratory reports with summary of bulk asbestos analysis results are available in the Architect/Certified Project Designer's office.
- C. The contractor shall be responsible for investigating the site and verifying conditions and quantities prior to the submission of his bid. The contractor shall not be permitted changes in the contract amount if specific variances are denied by New York State Department of Labor, Architect/Certified Project Designer, or any other agency.
- D. A site specific variance may be applied for at the contractor's cost. Use of a site specific variance requires approval of the Asbestos Abatement Project Designer.
- E. All work of this section shall be performed in accordance with 12 NYCRR Part 56 as most currently amended unless permitted otherwise by the NY State Department of Labor, the USEPA and the Owner's Representative.
- F. The contractor shall conform to Title 10 NYCRR Part 73 as most currently amended.
- G. Furnish all labor, materials, licenses, facilities, equipment, services, employee training and testing, permits and agreements necessary to perform the work required for asbestos removal, encapsulation and enclosure in accordance with these specifications, the latest regulations from the U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Asbestos Hazard Emergency Response Act (AHERA), the State of New York, the recommendations of the National Institute of Occupational Safety and Health (NIOSH) and Standard 241 of the National Fire Protection Association (NFPA).
- H. All work shall be performed in accordance with the U.S. Environmental Protection Agency (EPA) 40 CFR Part 763, Subpart E, AHERA Regulations for Removal of Asbestos in Schools and OSHA Title 29 CFR, Part 1910; sections 1001, 134, 1926.2 and 1926.1200.

1.2 SUBMITTALS

- A. Pre-Work Submittals: The Contractor shall submit to the Architect/Certified Project Designer three (3) copies of the documents listed below:
 - 1. Resume: Shall include the following:
 - a. Contractor license issued by New York State Dept. of Labor.
 - b. The number of years engaged in asbestos removal.
 - c. Provide a list of projects performed within the past two years and include the dollar value of all projects. Provide project references to include owner, consultant, and air-monitoring firms' name, contact person, address, and phone number.
 - d. An outline of the worker training course and medical surveillance program conducted by the contractor.
 - e. Emergency plans, including proposed work area evacuation routes and fire extinguisher locations.
- B. Citations/Violations/Legal Proceedings: Submit a notarized statement describing:

1. Any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.
 2. Any Stop Work Orders issued on projects within the past two years.
 3. Any litigation or arbitration proceedings arising out of performance on past projects.
 4. Any liquidated damages assessed within the last two years.
- C. Progress Schedule:
1. Show the complete sequence of construction by activity and the sequencing of work within each building or section of the work.
 2. Show the dates for the beginning and completion of each major element of work including substantial completion dates for each work area, building, or phase.
 3. Show final inspection dates.
- D. Site Specific Variance: Submit all proposed site specific variances for this project to the Architect for review and approval.
- E. Schedule of Values: Prepare a schedule of values, as required by the General Conditions identifying the value of work, by work area, associated with each type of asbestos material included in the scope of work. Identify mobilization and administration costs separately.
- F. Notifications: Submit notifications required by federal, state, and local regulations together with proof of timely transmittal to agencies requiring the notice (e.g. certified mail return receipt).
- G. Permits: Submit copies of current valid permits required by state and local regulations, including arrangements for storage, transportation, and disposal of contaminated materials.
- H. Abatement Work Plan: Provide plans which clearly indicate all work areas (numbered sequentially) including the locations and types of all decontamination chambers, entrances and exits to the work area, type of abatement activity/technique, number and location of negative air units and exhaust including calculations, and the proposed location and construction of storage facilities and field office.
- I. Worker Training and Medical Surveillance: The Contractor shall submit a list of the persons who will be employed by him and his subcontractors in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
- J. (Sub)-subcontractors List: The abatement (sub)-contractor shall submit a list of all sub-subcontractors to be used on the project.
- K. Project Supervisor: Submit the resume of the proposed Project Supervisor. Identify work history and substantiate ability to supervise this project.
- L. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of asbestos containing materials; understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.
- M. Project Closeout Submissions:
1. Submit copies of all waste disposal manifests, and disposal logs.
 2. Submit OSHA compliance air monitoring records conducted during the work.
 3. Submit copies of the daily progress log.
 4. Submit copies of the visitor's log.
 5. Submit Certificate of visual inspection obtained from the Project Monitor.
 6. Submit a list of all employees utilized on the project with social security and Asbestos Handler Certificate numbers.

7. Submit copies of any required Employee Statements such as Medical Examination statement, Certificate of Worker's Release, or Employee Training Statement.
8. Submit 3 copies of a description of work to be included in the Owner's AHERA Management Plan Building record. Indicate asbestos materials removed and quantities for each area(s) of abatement.

1.3 PROJECT SUPERVISOR

- A. The Contractor shall designate a full-time Project Supervisor who shall be on-site at all times work is in progress. If the Project Supervisor is not on-site, all work shall be stopped. The Project Supervisor must be able to read and write English fluently, as well as communicate with his workers. The Project Supervisor shall remain until the project is complete and cannot be removed without the written consent of the Owner and the Architect/Certified Project Designer.
- B. Prior to the commencement of work, the Contractor shall submit the proposed Project Supervisor's resume to the Owner and Architect/Certified Project Designer for approval. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.58 and shall have a minimum of one-year on-the-job training. This person shall hold certification as an Asbestos Project Supervisor.

1.4 ASBESTOS PROJECT MONITOR, AIR SAMPLING AND ANALYSIS FIRM

- A. An Asbestos Project Monitor, Air Sampling and Analysis firm shall be retained by the Owner to provide abatement project inspection and monitoring services and to conduct air sampling and provide laboratory analysis of air samples. This firm is responsible for ensuring that all abatement activities are in full compliance with all applicable federal, state, and local laws, rules, and regulations, and the contract documents. Air sampling and analysis required by OSHA regulations to be performed by the contractor shall be the responsibility of the contractor and will not be performed by the Air Sampling and Analysis Firm.
- B. The Asbestos Project Monitor shall have personnel on-site at all times the contractor is on-site. The contractor shall not be permitted to conduct any work, including mobilization and preparation, unless the Asbestos Project Monitor consultant is on-site.
- C. The Asbestos Project Monitor, and his on-site representative, shall have the authority to direct the actions of the contractor verbally and in writing to ensure compliance with the project documents and all regulations. The Asbestos Project Monitor shall have the authority to stop work when gross work practice deficiencies or unsafe practices are observed or ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.
- D. The Asbestos Project Monitor shall provide the following functions:
 1. Inspections of contractor's work, practices, and procedures for compliance with all regulations and project specifications. Notify the Owner/Architect of contractor non-compliance during the project.
 2. Maintain a daily log on-site of all activities undertaken by the contractor, all visitors to the site, and any unusual events.
 3. The inspector shall turn over copies of all daily logs, air-monitoring results, and any other reports prepared in the field to the Architect/Certified Project Designer.
 4. Verify daily that all workers used in the performance of the project is certified by the appropriate regulatory agency.
 5. Monitor the progress of the contractor's work and report any deviations from the schedule to the Architect/Certified Project Designer.
 6. Monitor, verify, and document all waste load-out operations. The Project Monitor shall maintain a disposal log indicating the time, date, quantity, and destination (including hauler information) of all waste removed from the site.

7. The Project Monitor shall ensure that the waste disposal procedures are being followed, including the use of container seals and the Authority's waste manifest.
 8. Verify that the contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
 9. Verify that all materials and equipment delivered to the site are in conformance with the contract documents and approved submittals.
 10. Ensure that all warning signs and notices required of the owner and the contractor are posted.
 11. Inspect each work area prior to abatement activities and document building damages prior to and after the abatement contractor performs the work.
 12. Inspect each work area to verify total asbestos abatement in accordance with the contract documents prior to clearance air sampling.
 13. Attend regular meetings to discuss project related issues.
 14. Deliver a bound final report to the Owner within 30 days of the completion of monitoring services which contains all project monitoring and air sampling documentation, credentials, an executive summary of the activities included in the report, and a statement that confirms that all monitoring and air sampling has been completed in compliance with New York State Department of Labor and Environmental Protection Agency regulations.
 15. The selected monitoring company shall NOT be permitted to provide testing and/or consulting services to the selected asbestos abatement contractor for any work on this project.
- E. The Project Monitoring services have been contracted for Monday through Friday, 8 hours per day. The time lines that have been established are based on the Owner's needs and the Contractor completing the work with sufficient manpower, supplies and organization within the scheduled time. If more hours are needed due to a lack of the Contractor's ability to meet the scheduled time lines, the cost for additional Project Monitoring and Air Sampling shall be the responsibility of the contractor.

1.5 AIR SAMPLING REQUIREMENTS

- A. Air Sampling shall be conducted as required by New York State regulations.
- B. Unless otherwise required by applicable regulations, samples shall be analyzed by Phase Contrast Microscopy (PCM) and final clearance air samples by Transmission Electron Microscopy (TEM) as outlined by paragraphs below. Chain of Custody must be maintained for all samples.
- C. Analytical services shall be provided by a laboratory certified by the New York State Department of Health Environmental Laboratory Approval Program specifically for the analytical procedure being used.
- D. Air sampling shall be performed by an individual with at least six months experience in abatement project air sampling and shall hold certification as a New York State Asbestos Handler or Asbestos Project Air Sampling Technician as required by applicable New York State regulations.
- E. The Asbestos Project Air Sampling Technician shall maintain a log on-site of all air monitoring conducted and the results of such monitoring.
- F. The air sampling technician must have an adequate quantity of equipment required to conduct the necessary air monitoring, including a sufficient number of air sampling pumps as well as leaf blowers and fans required for aggressive clearance air monitoring.
- G. To help maintain scheduled time lines, the work is divided into work areas for air monitoring as grouped below. Each area shall have separate pre, during and post abatement monitoring.
- H. Pre-abatement air samples shall be collected before the contractor arrives on site.

- I. During abatement samples shall be collected at locations selected by the PM/AST.
 - J. Inside air samples shall be collected by the PM/AST. These samples shall not be used to satisfy the contractor's responsibility for personal sampling.
 - K. TEM and PCM final air samples shall be collected in the same locations as the pre-abatement air samples.
 - L. Required Inspections - The following minimum inspections shall be conducted by the Asbestos Project Monitor. Additional inspections shall be conducted as required by project conditions. Progression from one phase of work to the next by the contractor is only permitted with the written approval of the Project Monitor.
 - 1. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the work areas and to documents these conditions. It shall be conducted with the owner, Asbestos Project Monitor, contractor, and the Architect/Certified Project Designer (as appropriate) prior to release of the building to the abatement contractor.
 - 2. Pre-Commencement Inspection: The purpose of the inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the work area is fully prepped for removal.
 - 3. Work Inspections: The purpose of this inspection is to monitor the work practices and procedures employed on the project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the Asbestos Project Monitor during preparation and removal activities at least twice every work shift.
 - 4. Visual Clearance Inspection: The purpose of this inspection is to verify the contractor's certification that all materials have been removed from the work area and the absence of all visible accumulations of debris in the work area. This inspection shall be conducted after encapsulation and removal of all surface plastic in the area, but before final air clearance testing. Critical barriers shall remain in place.
 - 5. Punch List Inspection: The purpose of this inspection is to verify the contractors' certification that all work has been completed as contracted and the condition of the existing area prior to its release to the owner.
- 1.6 MINOR ASBESTOS ABATEMENT PROJECT (LESS THAN OR EQUAL TO 25 LINEAR FEET OR 10 SQUARE FEET)(TENT/MINI ENCLOSURES)
- A. Pre-abatement air sampling/during-abatement air sampling; In compliance with New York Sate Department of Labor approved specific variance.
 - B. Final clearance air sampling; In compliance with New York State Department of Labor approved specific variance and New York State Education Department Final Clearance Air Sampling clarification dated August 2007:
 - 1. For areas up to Three (3) square feet or Three (3) linear feet; provide One (1) aggressive air sample inside and One (1) standard air sample outside the work area plus required blanks. Analysis by TEM.
 - 2. For areas over Three (3) square feet or Three (3) linear feet but less than Twenty-Five (25) linear feet or Ten (10) square feet; provide Five (5) aggressive air samples inside and One (1) standard sample outside the work area plus required blanks. []Analysis by TEM.
- 1.7 SMALL ASBESTOS ABATEMENT PROJECT (LESS THAN 260 LINEAR FEET OR 160 SQUARE FEET, GREATER THAN 25 LINEAR FEET OR 10 SQUARE FEET)
- A. Pre-abatement sampling; Three (3) samples inside and three (3) samples outside the work area plus required blanks. Analysis by PCM
 - B. During abatement; if required, during abatement air sampling shall be in compliance with New York State Department of Labor Applicable Variance and/or approved Specific Variance.

Analysis by TEM. (Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.

- C. Final clearance air samples;
 - 1. Five (5) aggressive air samples inside and three (3) standard samples outside the work area plus required blanks. Analysis by PCM. Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
 - 2. If one or both sets of samples do not meet the above stated final clearance air sample criteria, the contractor shall re-clean the work area and a complete duplicate set of final clearance air samples shall be collected by the Project Monitor/Air sample Technician. The contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.

1.8 LARGE ASBESTOS ABATEMENT PROJECT (260 LINEAR FEET OR 160 SQUARE FEET OR GREATER)

- A. Pre-abatement sampling; Five (5) samples inside and five (5) samples outside the work area plus required blanks. Analysis by PCM
- B. During abatement; Five (5) samples outside the work area plus required blanks. Analysis by PCM
- C. Final clearance air samples;
 - 1. Up to five (5) aggressive air samples inside and five (5) standard outside the work area plus required blanks. Analysis by TEM. Minimum requirement in compliance with New York State Department of Labor approved Specific Variance and New York State Education Department Final Clearance Air Sampling clarification, dated August 2007.
 - 2. If one or both sets of samples do not meet the above stated final clearance air sample criteria, the contractor shall re-clean the work area and a complete duplicate set of final clearance air samples shall be collected by the Project Monitor/Air sample Technician. The contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.

1.9 SCOPE OF WORK

- A. The quantities listed in the tables are for informational purposes ONLY. The contractor shall be responsible for ALL asbestos containing materials within the work areas.
- B. Work areas are as follows:
 - 1. Work Area #1 Involves the removal all marker boards, Tack Boards, and caulk boards only from the wall indicated within the abatement plan CS-AB1.0. Remove/abate mastic from walls and boards that were holding boards to wall. Rooms included in Abatement Work Area 1 are: 116, 118, 120, 121, 122, 123, and 125.
 - 2. Work Area #2– Involves the removal all marker boards, Tack Boards, and caulk boards only from the wall indicated within the abatement plan CS-AB1.0. Remove/abate mastic from wall and boards that were holding boards to wall. Room included in Abatement Work Area 2 is: 117
 - 3. Work area 3 - Involves the removal all marker boards, Tack Boards, and caulk boards only from the wall indicated within the abatement plan CS-AB1.0. Remove/abate mastic from walls and boards that were holding boards to wall. Rooms in this work area 3 are located on the second floor and are: 205, 206, and 207.
- C. The work shall be completed in one phase within the following schedule:
 - 1. Work Area #1 Completed 3 working days.
 - 2. Work Area #2 Completed in 1 working days.
 - 3. Work Areas # 3 Completed in 1 working days.

- D. The Asbestos Abatement Contractor shall remove existing carpet floor finishes at locations where present over existing asbestos containing floor tile.
- E. The Contractor shall remove vinyl and/or wood base and mastic where present in concurrence with the removal of vinyl asbestos floor tile.
- F. Dumpster locations and lift usage shall be subject to acceptance by the Architect/Certified Project Designer.
- G. If final clearance air samples do not meet the criteria as regulated by New York State Department of Labor and the New York State Education Department, the contractor shall re-clean the work area and a complete, duplicate set of final clearance air samples, shall be collected by the Project Monitor/Air Sampling Technician. The Contractor shall be responsible for all cost of the air sampling and subsequent analysis until all final clearance air sample criteria has been achieved.
- H. Asbestos material testing information is available for review. The contractor shall be responsible for the abatement of all asbestos containing materials in preparation for demolition by others. If bulk sampling is required to determine a complete abatement the Owner shall perform all testing, and all sampling costs shall be the responsibility of the Contractor.
- I. Only low odor mastic remover shall be approved for use. Mastic remover must be thoroughly cleaned from all areas of the building. Permeable materials (wood, drywall, carpets, plaster, etc.) must be protected from absorbing the mastic remover solvents. Mastic remover application and cleanup instructions must be strictly followed. A minimum of two soap and water washes must be provided on all surfaces where mastic remover was applied. The asbestos abatement contractor shall be responsible to assure that the mastic remover is compatible with scheduled finishes to maintain all product system warranties.
- J. Mastic shall be removed thoroughly to the point at which scraping mastic with a metal scraper will not produce build-up of mastic material on the scraper.
- K. The abatement contractor shall disconnect and remove existing unit ventilators and unit ventilator metal shelving. The asbestos abatement contractor shall removal vinyl asbestos floor tile below unit ventilator and unit ventilator shelving. The abatement contractor shall reconnect existing unit ventilators and unit ventilator shelving to existing layout.
- L. Any encapsulant, mastic remover or other product used, shall be compatible with the new finishes. It shall be the contractor's responsibility to coordinate the product being used with the new finish products. No encapsulant, mastic remover and/or other product shall be used that has not been approved.
- M. Owner's personnel shall move all equipment, furniture, etc. that is not fixed in place. The contractor shall be responsible to remove all other items unless noted otherwise. The contractor shall be responsible for all system disconnection and reconnections associated with the work including but not limited to lights, fire alarm, HVAC equipment, etc.
- N. Roof mechanical shut down, if needed, shall be coordinated with the Owner and/or the Owner's representative.
- O. The contractor shall be responsible to employ removal methods, sufficient cleaning and/or other such means, methods or equipment to provide areas free of odors, fumes, and/or irritants or residues. The contractor shall respond and remove the cause of such odors, fumes or irritants at its own expense if notified by the Owner or Architect/Certified Project Designer, within six months of the date of substantial completion.

1.10 LICENSING AND CERTIFICATION

- A. The contractor must have successfully completed a contractor supervisor course approved by the EPA.
- B. The contractor must hold a valid State of New York, Department of Labor asbestos contractor's license. A copy of this asbestos license shall be conspicuously displayed proximate to but outside the work area during the duration of the project.
- C. The contractor shall permit only those persons who hold valid State of New York Department of Labor asbestos handling certificates to engage in work on this project.
- D. The Contractor shall have EPA Certification as an Asbestos Contractor.

PART 2 UTILITIES

2.1 WATER:

- A. When feasible, interrupt the flow of water to areas where asbestos removal shall be conducted. This requirement shall be mandatory in areas of demolition.
- B. The Owner shall furnish access to water required for construction, at no cost to the contractor. The contractor shall be responsible for any plumbing work or fixtures necessary to connect to the Owner's existing system, and shall be required to provide anti-siphon devices at the connection to the Owner's water system.
- C. Contaminated water shall be treated by a several stage filter system consisting minimally of a 25 micron filter followed by a 5 micron filter and typically by a 5 micron, 50 micron and 100 micron filter series prior to disposal in a municipal sewage system. This process may only be used when not contrary to local ordinances.
- D. Coordinate with the Owner for the nearest hookup and drainage. It shall be the contractor's responsibility to connect the water source to the location needed and to provide required drainage.

2.2 ELECTRICITY:

- A. Electricity shall be from the Owner's designated panel box, through the contractor's power board, to the work area. The contractor shall supply the air-monitoring firm with sufficient outlets.
- B. The contractor shall label any circuits disabled in conjunction with the work; "TEMPORARILY DISCONNECTED DUE TO RENOVATION WORK. DO NOT ACTIVATE THESE CIRCUITS – SAFETY HAZARD".
- C. The contractor shall supply a power board on site designed to handle the expected electrical load during the project. The power board shall be installed, tested and activated prior to any other site work for the execution of this contract. This work shall be accomplished by a properly trained and experienced electrician.
- D. Provide as required by 29 CFR 1926, temporary 120/240 Volt, single phase, three wire, 100 amp electric service with Ground Fault circuit Interrupters (GFCI) for electrical requirements for the project. No damaged electrical cords shall be allowed on site. Draw out power service from Owner's existing power panel to service the contractor's power board. Each HEPA unit shall be circuited to a separate and unique breaker with a minimum of 15 amp. service to prevent multiple loss of negative pressure units.

- E. Provide temporary lighting with "weatherproof" fixtures for work areas including the decontamination chambers.
- F. Provide electrical service as needed by the Project Monitor and the AST (including GFCI). Minimum electrical services that are to be provided include:
 - 1. Six 15 amp. protected 3 prong outlets within the work area.
 - 2. Six 15 amp protected 3 prong outlets for work areas outside of the containment zone or area.
 - a. The Owner shall not be responsible for making available to the contractor temporary electrical service systems.
 - b. The contractor shall supply power and connections to maintain fire alarms and security system in non-work areas. The contractor may also be required to provide temporary electrical service to occupied portions of the building.

PART 3 EXECUTION

3.1 WORK AREA PREPARATION

- A. The work area shall be vacated by the occupants prior to work area preparation and until satisfactory clearance air monitoring results have been achieved.
- B. Caution signs meeting the specifications of OSHA 29 CFR 1910.1001(j) shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.
- C. Shut down and lock out electric power to all work areas. Provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault circuit interrupter at the source.
- D. The personal decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.
- E. Heating, Ventilating and Air Conditioning (HVAC) System Isolation. Acceptable methods for HVAC system isolation shall include conformance with NYCRR Title 12, Subpart 56-8.
- F. Shutdown and isolation HVAC systems to prevent contamination and asbestos dispersal to other areas of the building or structure.
- G. Contaminated HVAC filters shall be handled and disposed of as asbestos waste material. The ducts and filter assembly shall be wet cleaned and/or HEPA vacuumed where system air samples and/or dust samples indicate asbestos contamination.
- H. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects and items shall be enclosed with two layers of at least six-mil plastic sheeting and sealed with tape.
- I. The work area shall be cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be permitted.
- J. Isolation barriers that seal off all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetrations of the work area shall

be constructed using two layers of at least six mil, fire retardant plastic sheeting sealed with tape. Also, all seams in system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.

- K. Separation of the work area from the remainder of the work site by construction of isolation barriers shall be accomplished as follows:
 - 1. Wall shall be constructed of wood or metal framing to support barriers in all openings larger than thirty-two square feet, except where any one dimension is one foot, or less.
 - 2. A sheathing material of at least three-eighths inch thickness shall be applied to the work side of the barrier.
 - 3. Edges of the partition shall be caulked at the floor, ceiling, walls and fixtures to form an airtight seal.
 - 4. The work area side of the partition shall be covered with a double layer of at least six-mil, fire retardant plastic sheathing with staggered joints and sealed.
- L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

3.2 TRANSPORTATION AND DISPOSAL

- A. Applicable Regulations:
 - 1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following regulations:
 - a. NYS DEC 6 NYRCC part 360 and 364
 - b. USEPA NESHAPS 40 CFR 61
 - c. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007
- B. Transportation and Disposal Site:
 - 1. The Contractor's hauler and disposal site shall be subject to the approval of the Project Monitor.
 - 2. The Contractor shall give 24-hour notification prior to removing any waste from the site. Waste shall be removed from site only during normal working hours unless otherwise specified. No waste may be taken from the site without authorization from the Project Monitor.
- C. Prior to the removal of any waste materials from the site, the contractor shall submit a complete and valid copy of an "industrial Waste Transporter Permit" specifically for asbestos-containing materials, pursuant to 6 NYCRR 364 for the transporting of waste. Only vehicles listed on this permit shall be allowed to transport waste materials from the site.
- D. Waste Shipment Record; Prior to the transport of any waste materials from the site, the contractor shall submit a Waste Shipment Record (WSR) to the Project Monitor with generator and transporter sections completely filled in and signed for each day on which asbestos waste is removed from the site. Provide originally signed WSR to Project Monitor so he can make copies for records and return the originally signed WSR to transporter so that original signature of landfill agent can be entered upon delivery to landfill. This documentation shall include the amount of waste removed, in both numbers of bags or containers, which correspond to the Project Monitor's logged count and cubic yards. The WSR shall include the, name and address of the transporter, the landfill to which the waste is transported, the quantity accepted by the landfill and the signature of the landfill official who accepts the delivery. Waste Shipment Records bearing the original signature (carbon copy bearing impressions of the original signatures are acceptable) of the landfill agent receiving the waste must be received by the Owner/Architect/Certified Project Designer within 35 days of shipment. Failure to comply shall result in a detailed report being transmitted to the New York State Department of Labor and EPA-NESHAPS.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete Block.
- B. Clay Facing Brick.
- C. Mortar and Grout.
- D. Reinforcement and Anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Control
- B. Section 07 84 00 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- C. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.
- D. Section 09 21 16 - Gypsum Board Assemblies

1.3 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- F. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.
- G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- H. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.
- I. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2014.
- J. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

- K. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2014.
- L. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- M. ASTM C476 - Standard Specification for Grout for Masonry; 2010.
- N. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2012.
- O. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2010.
- P. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.
- Q. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- R. MSJC (Masonry Standards Joint Committee) Code - ACI (American Concrete Institute) 530/ASCE (American Society of Civil Engineers) 5/TMS (The Masonry Society) 402 - Building Code Requirements for Masonry Structures.
- S. MSJC (Masonry Standards Joint Committee) Specification - ACI (American Concrete Institute) 530.1/ASCE (American Society of Civil Engineers) 6/TMS (The Masonry Society) 602 - Specifications For Masonry Structures.
- T. UL (FRD) - Fire Resistance Directory; current edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit two samples of facing brick units to illustrate color, texture, and extremes of color range. Brick must match the range of color and texture of the existing brick or as selected by Architect.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Perform Work in accordance with MSJC Code and MSJC Specification.
- C. Fire Rated Assemblies: Conform to applicable code for UL (FRD) Assembly No. ____.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Manufacturers:
 - 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - a. Southern Tier Concrete Products.
 - b. Dagostino Building Blocks.
 - c. York Building Products, Inc.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
- B. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on the drawings for specific locations to match existing construction.
 - 2. Load-Bearing Units: ASTM C90, normal weight.
 - 3. Non-Loadbearing Units: ASTM C129.

2.2 BRICK UNITS

- A. Manufacturers:
 - 1. The Belden Brick Co.
 - 2. Glen-Gery Brick
 - 3. Boral Bricks, Inc; _____: www.boralbricks.com/#sle.
 - 4. Sioux City Brick & Tile Company
- B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Color and texture: Match existing.
 - 2. Nominal size: Match existing.
 - 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.

1. Color(s): As selected by Architect from manufacturer's full range.
2. Manufacturers:
 - a. Davis Colors; _____: www.daviscolors.com/#sle.
 - b. Lambert Corporation; _____: www.lambertusa.com/#sle.
 - c. Solomon Colors; _____: www.solomoncolors.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Water: Clean and potable.

2.4 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:

1. Dur-O-Wal: www.dur-o-wal.com.
2. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
3. WIRE-BOND: www.wirebond.com/#sle.

B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.

C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

D. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

E. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.

F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.

G. Wall Ties: Corrugated formed sheet metal, 7/8 inch wide by 0.05 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.

H. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.

1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
3. Vertical adjustment: Not less than 3-1/2 inches.

2.5 FLASHINGS

A. Rubberized Asphalt Flashing: Self-adhering polymer-modified asphalt sheet; 0.030 inch total thickness; with cross-linked polyethylene top and bottom surfaces.

2.6 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/sle.

- b. WIRE-BOND: www.wirebond.com/#sle.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Full-Height Airspace Maintenance and Drainage Material: Mesh panels, fitted between masonry ties.
- D. Type: Polyester mesh.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - b. WIRE-BOND: www.wirebond.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. All material cleaning shall be done as recommended by material supplier.

2.7 LINTELS

- A. Size and configuration as indicated on drawings.

2.8 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior, loadbearing masonry: Type N.
 - 3. Exterior, non-loadbearing masonry: Type N.
 - 4. Interior, loadbearing masonry: Type N.
 - 5. Interior, non-loadbearing masonry: Type O.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running, unless shown otherwise in contract documents.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running, unless shown otherwise in contract documents.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tie is scheduled or resilient base is scheduled.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.5 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.6 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor retarder adhesive.
- C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch greater than panel thickness.

Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.

- D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.
- E. Install cavity wall vents in veneer at 16 inch o.c. horizontally at top of exterior walls and below windowsills.

3.7 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.8 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.9 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up at least 8 inches, minimum, to form watertight pan at non-masonry construction.
- B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.

3.10 LINTELS

- A. Install loose steel lintels over openings.
- B. Maintain minimum 6 inch bearing on each side of opening.

3.11 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web unless noted otherwise on contract documents.
- B. Lap splices minimum 48 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.12 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Form expansion joint as detailed on drawings.

3.13 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, fabricated metal frames, wood nailing strips, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.14 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.15 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and ductwork. Coordinate with other sections of work to provide correct size, shape, and location.

- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
 - 1. The agency shall monitor the proportioning, mixing, and consistency of mortar and grout; the placement of mortar, grout and masonry units; and the placement or reinforcing steel for compliance with the contract documents.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67 requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.
- E. The agency shall prepare one set of prisms for testing at 7 days and one set for testing at 28 days. Tests are to be conducted by the agency for each 3,000 square feet of wall installed, but not less than two tests.

3.17 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.18 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- B. Protect base of walls from mud and mortar splatter.
- C. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.
- D. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formed steel stud exterior wall framing.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking and miscellaneous framing.
- C. Section 07 21 00 - Thermal Insulation: Insulation within framing members.
- D. Section 07 25 00 - Weather Barriers: Weather barrier over sheathing.
- E. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.3 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- E. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2011c.
- F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, and limitations .
- C. Manufacturer's Installation Instructions: Indicate special procedures, and conditions requiring special attention .
- D. Mill Certifications: Submit mill certifications for steel delivered to site. Certify steel bare metal thickness in 0.001 inch, yield strength, tensile strength, total elongation in 2 inch or 8 inch gage length, chemical analysis and galvanized coating thickness.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Framing:
 - 1. ClarkDietrich Building Systems; _____: www.clarkdietrich.com/#sle.
 - 2. Marino; _____: www.marinoware.com/#sle.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Framing Connectors and Accessories:
 - 1. Same manufacturer as metal framing.

2.2 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Criteria: Provide completed framing system having the following characteristics:
 - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
 - 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
 - 3. Design Loads: In accordance with applicable codes.
 - a. Vertical Assembly: positive and negative loads as calculated in accordance with the Building Code.
 - b. Horizontal Assembly: live and dead loads as indicated on the drawings.
 - c. Interior stud framing to be designed to resist minimum 5 psf uniform load and maximum 1/360 deflection
 - 4. Maximum Allowable Deflection: 1/600 of span or 0.3 inches, whichever is less
 - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - 7. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with the Building Code.
- C. Deliver to site in largest practical sections.

2.3 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
 - 1. Gage: Determined from load requirements, 18 gage/_____ inch minimum.
 - 2. Stud Depth: 3-5/8" inch.

3. Stud Spacing: 16" o.c. maximum
4. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
5. Provide components fabricated from ASTM A1008/A1008M, Designation SS (structural steel).

2.4 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.5 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.
- C. Welding: In conformance with AWS D1.1/D1.1M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements; Coordination and project conditions.
- B. Verify that substrate surfaces and building framing components are ready to receive work.
- C. Verify rough-in utilities are in proper location.

3.2 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie or fastener method.
- D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- E. Install load bearing studs full length in one piece. Splicing of studs is not permitted.
- F. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.

- I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs or furring channels to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch-up field welds and damaged galvanized surfaces with primer to match shop coating.

3.3 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated steel and metal items, including:
 - 1. Lintels

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- B. 08 12 13 - Hollow Metal Frames

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- E. ASTM F 1554 - Standard Specification for Anchor Bolts, Steel 36, 55, and 105 ksi Yield Strength.
- F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- H. NOMMA Guideline 1 - Joint Finishes
- I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- K. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Design lintels under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Finish joints in accordance with NOMMA Guideline 1.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Steel Plates: ASTM A 36/A 36M.
- D. Slotted Channel Framing: ASTM A 653, Grade 33 Structural quality with galvanized coating.
- E. Bolts, Nuts, and Washers:
 - 1. Bolts: ASTM A 325; Type 1
 - 2. Nuts: ASTM A 563 heavy hex type
 - 3. Washers: ASTM F 436; Type 1
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, Type 1, complying with VOC limitations of authorities having jurisdiction.
 - 1. Color: Gray
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

- A. Lintels: Steel sections, size and configuration as detailed on drawings, length to allow 8 inches minimum bearing on both sides of opening.
 - 1. Galvanized and Prime paint, one coat
- B. Anchor bolts: ASTM F 1554; Grade 36, weldable, straight shape, Furnish with nut and washer; unfinished.

2.4 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete or masonry and items as specified in drawings..
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements; minimum 2.0 oz/sq ft coating thickness.
- G. Galvanizing for Fasteners, Connectors and Anchors: Hot-Dipped Galvanizing to ASTM A 153/A 153M.

2.5 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

- A. Welding: Inspect welds in accordance with AWS D1.1.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preservative treated wood materials.
- B. Communications and electrical room mounting boards.
- C. Concealed wood blocking, nailers, and supports.

1.2 RELATED REQUIREMENTS

- A. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
- B. Section 10 11 00 - Visual Display Surfaces.
- C. Division 22 and 26 – All products requiring blocking or backboards.

1.3 REFERENCE STANDARDS

- A. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.; 2011
- B. ANSI A208.1 - American National Standard for Particleboard; 2009.
- C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- E. AWWA U1 - Use Category System: User Specification for Treated Wood; 2012.
- F. PS 1 - Structural Plywood; 2009.
- G. PS 20 - American Softwood Lumber Standard; 2010.
- H. SPIB (GR) - Grading Rules; 2014.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.3 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Stainless steel for high humidity and preservative-treated wood locations, hot dipped galvanized per ASTM A153/A153M elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
 - 3. Fasteners for roof replacements must be included in the Singly-Ply Roofing membrane manufacturer's warranty to meet uplift pressures determined in accordance with Chapter 16 of the New York State Building Code using a basic wind speed of 90 MPH.

2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
 - 1. Manufacturers:
 - a. _____.

- b. Substitutions: See Section 01 60 00 - Product Requirements.
- 2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Do not use treated wood in direct contact with the ground.
- 3. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as indicated .
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.
 - 1. Manufacturers:
 - a. _____.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

- E. Provide the following specific non-structural framing and blocking:
 - 1. Chalkboards and marker boards.

3.4 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Install adjacent boards without gaps.
 - 3. Size and Location: As indicated on drawings.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Board insulation at cavity wall construction and exterior wall behind _____ wall finish.
- B. Batt insulation in exterior wall construction.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry
- B. Section 05 40 00 - Cold-Formed Metal Framing: Board insulation as wall sheathing.
- C. Section 06 10 00 - Rough Carpentry: Supporting construction for batt insulation.
- D. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.
- E. Section 07 84 00 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.
- F. Section 09 21 16 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.3 REFERENCE STANDARDS

- A. ASTM C240 - Standard Test Methods of Testing Cellular Glass Insulation Block; 2008 (Reapproved 2012).
- B. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2015.
- C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.
- D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- G. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- J. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.
- K. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- L. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

- M. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.5 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Thermal Insulation:
 - 1. Owens Corning Fiberglass Owens Corning Fiberglass
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FOAM BOARD INSULATION MATERIALS

- A. Polyisocyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type I, aluminum foil both faces; Class 1, non-reinforced foam core.
 - 1. Flame Spread Index (FSI): Class B - 26 to 75, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 3. Complies with fire resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 - 4. Compressive Strength: 16 psi
 - 5. Board Size: 48 by 96 inch.
 - 6. Board Thickness: 2 inch.
 - 7. Thermal Resistance: R-value of 13 minimum.
 - 8. Board Edges: Square.
 - 9. Manufacturers:
 - a. Johns Manville; AP Foil-Faced: www.jm.com/#sle.
 - 10. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 BATT INSULATION MATERIALS

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 3. Thickness: 3-1/2 inch.
 - 4. Thickness: As noted on drawing.
 - 5. Facing: Unfaced.

6. Manufacturers:
 - a. CertainTeed Corporation; _____: www.certainteed.com/#sle.
 - b. Johns Manville; _____: www.jm.com/#sle.
 - c. Knauf Insulation GmbH: www.knaufinsulation.us.
 - d. Owens Corning Corp: www.owenscorning.com.
7. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 ACCESSORIES

- A. Sheet Vapor Retarder: Specified in Section 07 25 00.
- B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- D. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT CAVITY WALLS

- A. Secure impale fasteners to substrate at following frequency:
 1. Six (6) per insulation board.
- B. Adhere a 6 inch wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 1. Extend sheet full height of joint.
- C. Install boards to fit snugly between wall ties.
 1. Place membrane surface facing out, and tape seal board joints.
- D. Install boards horizontally on walls.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- F. Place 6 inch wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.

3.3 BATT INSTALLATION

- A. Install in exterior wall spaces without gaps or voids. Do not compress insulation.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

- D. Metal Framing: Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- F. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
- G. Coordinate work of this section with requirements for vapor retarder specified in Section 07 25 00.
- H. Coordinate work of this section with construction of air barrier seal specified in Section 07 25 00.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vapor Retarders: Materials to make exterior walls water vapor resistant and air tight.
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls.

1.2 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing: Water-resistive barrier under exterior cladding.
- B. Section 09 21 16 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

1.3 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- D. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation.

1.6 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.1 WEATHER BARRIER ASSEMBLIES

- A. Exterior Vapor Retarder:
 - 1. On outside surface of insulation use vapor retarder coating.

2.2 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
 - 1. Water Vapor Permeance: 1.0 perm, maximum, when tested in accordance with ASTM E96/E96M.
 - 2. VOC Content: Less than 50 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
 - 4. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
 - 5. Products:
 - a. Carlisle Coatings and Waterproofing, Inc; Barriseal-R: www.carlisleccw.com/#sle.
 - b. Hohmann & Barnard, Inc; ENVIRO-BARRIER: www.h-b.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 - 6. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.3 ACCESSORIES

- A. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
- B. Thinners and Cleaners: As recommended by material manufacturer.
- C. Repair Tape: Polyethylene self-adhering type, 2 inch wide, compatible with sheet material.
- D. Mastic Tape: Double sided, asphaltic, pressure sensitive mastic tape compatible with sheet material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- E. Self-Adhesive Sheets:
 - 1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
 - 2. Lap sheets shingle-fashion to shed water and seal laps air tight.
 - 3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all laps are firmly adhered with no gaps or fishmouths.
 - 4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
 - 5. At wide joints, provide extra flexible membrane allowing joint movement.
- F. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Use flashing to seal to adjacent construction and to bridge joints.
- G. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 - 3. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 - 4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
 - 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Do not cover installed weather barriers until required inspections have been completed.
- C. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

3.5 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.2 RELATED REQUIREMENTS

- A. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.3 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2015.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Verification of minimum three years documented experience installing work of this type.

1.6 MOCK-UP

- A. Install one firestopping assembly representative of each fire rating design required on project.
 - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
- B. If accepted, mock-up will represent minimum standard for the Work.
- C. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.7 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products; _____: www.3m.com/firestop/#sle.
 - 2. A/D Fire Protection Systems Inc; _____: www.adfire.com/#sle.
 - 3. Hilti, Inc: www.us.hilti.com/#sle.
 - 4. Nelson FireStop Products; _____: www.nelsonfirestop.com/#sle.
 - 5. Specified Technologies Inc; _____: www.stifirestop.com/#sle.
 - 6. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: www.tremcosealants.com/#sle.
 - 7. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.3 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

- A. Gypsum Board Walls:
 - 1. Wall to Wall Joints That Have Not Been Tested For Movement Capabilities (Static):
 - a. 2 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - b. 1 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.

2.4 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 - 1. 2 Hour Construction: UL System W-L-0038; Specified Technologies Inc. FP Intumescent Firestop Plug.
 - 2. 1 Hour Construction: UL System W-L-0038; Specified Technologies Inc. FP Intumescent Firestop Plug.

2.5 FIRESTOPPING SYSTEMS

- A. Manufacturers:
 - 1. A/D Fire Protection Systems, Inc. .
 - 2. Dow Corning Corp. .
 - 3. Hilti Corp. .
 - 4. 3M fire Protection Products .
 - 5. United States Gypsum Co. .
 - 6. Substitutions: Section 01 60 00 - Product Requirements .
- B. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: 1 hour at all corridor walls.

2.6 MATERIALS

- A. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant; conforming to the following:
 - 1. Elongation: 40 percent.
 - 2. Durability and Longevity: Permanent.
- B. Foam Firestopping: Single component silicone foam compound; conforming to the following:
 - 1. Density: 18 lb/cu ft.
 - 2. Durability and Longevity: Permanent.
- C. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers; conforming to the following:
 - 1. Density: 3.5 lb/cu ft.
 - 2. Durability and Longevity: Permanent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install damming materials to arrest liquid material leakage.

3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements.
- B. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing
- C. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.4 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

3.5 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.6 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping: Firestopping sealants.
- B. Section 08 80 00 - Glazing: Glazing sealants and accessories.
- C. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.3 REFERENCE STANDARDS

- A. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- D. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
- E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 7. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Installation Plan: Submit at least four weeks prior to start of installation.
- F. Installation Log: Submit filled out log for each length or instance of sealant installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience and approved by manufacturer.
- C. Installation Plan: Include schedule of sealed joints, including the following.
 - 1. Joint width indicated in contract documents.
 - 2. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
 - 3. Installation Log Form: Include the following data fields, with known information filled out.
 - a. Unique identification of each length or instance of sealant installed.
 - b. Location on project.
 - c. Substrates.
 - d. Sealant used.
 - e. Primer to be used, or indicate as "No primer" used.
 - f. Size and actual backing material used.
 - g. Date of installation.
 - h. Name of installer.
 - i. Actual joint width; provide space to indicate maximum and minimum width.
 - j. Actual joint depth to face of backing material at centerline of joint.
 - k. Air temperature.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 2. Dow Corning Corporation; _____: www.dowcorning.com/construction/#sle.
 - 3. Tremco Global Sealants: www.tremcosealants.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
 - 1) Exception: Such gaps and openings in gypsum board, plaster, and _____ finished stud walls and suspended ceilings.
 - c. Other joints indicated below.
 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag [] sealant[], unless otherwise indicated.
1. General Purpose Exterior (non-Traffic); Type 1, use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior non-traffic joints for which no other sealant is indicated
 2. Lap Joints in Sheet Metal Fabrications; Type 2, use for:
 - a. Concealed sealant bead in sheet metal work.
 - b. Concealed sealant bead in siding overlaps
- C. Interior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
1. Wall and Ceiling Joints in Non-Wet Areas; Type 3, use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated
- D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.3 NONSAG JOINT SEALANTS

- A. Type 1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M, G and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 4. Color: Match adjacent finished surfaces, Submit colors to Architect for approval.
 5. Cure Type: Single-component, neutral moisture curing.
 6. Manufacturers:
 - a. Dow Corning Corporation; 790 Silicone Building Sealant: www.dowcorning.com/construction/#sle.
 - b. Tremco, Inc; Spectrem 3: www.tremcosealants.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Type 2 - Silicone Sealant: ASTM C920, Grade NS, Class S, Uses NT; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
 2. Color: Match adjacent finished surfaces, Submit colors to Architect for approval.
 3. Cure Type: Single-component, neutral moisture curing
 4. Manufacturers:
 - a. Dow Corning Corporation; 791 Silicone Weatherproofing Sealant: www.dowcorning.com/construction/sle.
 - b. Tremco, Inc; Spectrem 1: www.tremcosealants.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Type 3 - Silicone Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT, G, M, and A.
1. Movement Capability: Plus and minus 50 percent, minimum.
 2. Color: Match adjacent finished surfaces, Submit colors to Architect for approval.
 3. Cure Type: Single-component, neutral moisture curing
 4. Manufacturers:
 - a. Dow Corning Corporation; 791 Silicone Weatherproofing Sealant: www.dowcorning.com/construction/sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements

2.4 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
 5. Manufacturers:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- D. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.4 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION

SECTION 08 81 00
FIRE RATED GLASS

P1 GENERAL

1.1 SUMMARY

- A. Section includes fire rated glass for installation in steel frames and vision panels for fire rated doors.
- B. Related Sections:
 - 1. Section 08 14 16 - Flush Wood Doors: Glazed doors.
 - 2. Section 08 71 00 – Door Hardware.

1.2 REFERENCES

- A. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- B. ASTM International:
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- D. ASTM E2074-00: Standard Test Method for Fire Tests of Door Assemblies, Including Positive pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
- E. ASTM E119 - Standard Test Method for Fire Tests of Building Construction and Materials.
- F. GANA - FGMA Sealant Manual.
- G. GANA - Glazing Manual.
- H. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing.
- I. NFPA 80 - Standard for Fire Doors, Fire Windows.
- J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- K. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.
- L. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
- M. UL - Building Materials Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide fire rating to glazing materials as follows:
 - 1. Duration of Fire Rating -- Doors: Capable of providing a fire rating for 90 minutes.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Show doors, frames, hardware and steel frame components as shown on shop drawings and schedules.
- C. Obtain Architect's approval before fabrication.
- D. Product Data: Submit latest edition of manufacturer's product data providing product descriptions, technical data and installation instructions.

- E. Samples: Provide the following products, in the form of 12-inch square samples for glass and of 12-inch long Samples for sealants. Install sealant samples between two strips of material representative in color of the adjoining framing system
- F. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.
- B. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- C. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- D. Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- E. An approved independent testing laboratory equal to UL shall conduct fire test.
- F. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies. .

1.6 QUALIFICATIONS

- A. Installer Qualifications: An installer with 5 years experience who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

1.7 PRE-INSTALLATION MEETING

- A. Section 01 30 00 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week before starting Work of this section.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle under provisions specified by manufacturer. For details on storage and product handling, please contact Manufacturer and request information on storage and product handling.
- B. Deliver materials to specified destination in manufacturer or distributor's packaging undamaged, complete with installation instructions.
- C. Store off ground, under cover, protected from weather and construction activities.

1.9 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

- B. Provide the Manufacturer's limited five year warranty.

PART 2 PRODUCTS

2.1 FIRE RATED GLASS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following manufacturers:
 1. Vetrotech Saint Gobain North America Inc.
 2. Pilkington Group
 3. Substitutions: Section 01 60 00 - Product Requirements.

2.2 MATERIALS - GLASS

- A. Fire Rated Glazing FRG. "KERALITE FR-ULTRA"
 1. Properties:
 - a. Laminated clear glass ceramic & intumescent technology.
 - b. Thickness: 3/4 inch overall.
 - c. Weight: 6 lbs./sq. ft.
 - d. Approximate Visible Transmission: 83 percent.
 - e. Approximate Visible Reflection: 9 percent.
 - f. Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications with hose stream in accordance with NFPA 252.
 - g. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 - h. STC Rating: Approximately 35 dB.
 - i. Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes
 2. Logo: Each piece of fire-rated glazing shall be permanently labeled with the Manufacturer's, Warnock Hersey, and/or, Underwriters Laboratories' Logos on sizes up to 3325 sq. inches. Label is also to include name of product, fire rating period, safety glazing standards, and date of manufacture.

2.3 ACCESSORIES

- A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
- B. Glazing Compound: DAP 33 putty.
- C. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:
 1. Dow Corning 795 - Dow Corning Corp.
 2. Silglaze-II 2800 - General Electric Co.
 3. Spectrem 2 - Tremco Inc.
- D. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.
- E. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.4 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirement.
- B. Fabrication Dimensions: Fabricate fire rated assembly to approved dimensions. Guarantee dimensions where practicable within required tolerance.
- C. Obtain approved Shop Drawings prior to fabrication.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Examine glass framing, with glazier present, for compliance with the following.
 - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Observable edge damage or face imperfections.
- D. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- E. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealant in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
 - 1. Glazing Sealants: Comply with FGMA and ASTM C1193.
 - 2. Fire Rated Openings: Comply with NFPA 80.
- B. Protect glass from edge damage during handling and installation. Inspect glass during installation and discard pieces with edge damage that could affect glass performance.
- C. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
- D. Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.
- E. Place setting blocks located at quarter points of glass with edge block no more than 6 inches from corners.

- F. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.
- G. Place glazing tape on free perimeter of glazing in same manner described above.
- H. Install removable stop and secure without displacement of tape.
- I. Install in vision panels in fire-rated doors to requirements of NFPA 80.
- J. Install so that appropriate UL markings remain permanently visible.

END OF SECTION

SECTION 08 12 13
HOLLOW METAL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal frames for non-hollow metal doors.
- B. Fire-rated hollow metal frames for non-hollow metal doors.

1.2 RELATED REQUIREMENTS

- A. Section 08 14 16 - Flush Wood Doors: Non-hollow metal door for hollow metal frames.
- B. Section 08 71 00 - Door Hardware: Hardware, silencers, and weatherstripping.
- C. Section 08 81 00 - Fire Rated Glazing
- D. Section 09 90 00 - Painting and Coating

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- L. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

- N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- D. Samples: Submit one sample of frame metal, 2 inch by 2 inch, showing factory finishes, colors, and surface textures.
- E. Manufacturer's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Frames with Integral Casings:
 - 1. Ceco Door, an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
 - 2. Republic Doors; _____: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand; _____: www.allegion.com/#sle.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 DESIGN CRITERIA

- A. Refer to Door and Frame Schedule on the drawings for frame sizes, fire ratings, sound ratings, finishing, door hardware to be installed, and other variations, if any.
- B. Door Frame Type: Provide hollow metal door frames with integral casings.
- C. Steel used for fabrication of frames shall comply with one or more of the following requirements; galvanized steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
- D. Accessibility: Comply with ICC A117.1 and ADA Standards.
- E. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.

- F. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.
- G. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- I. Mullions for Pairs of Doors: Removable type, with profile similar to jambs.
- J. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.
- K. Frames Wider than 48 Inch: Reinforce with steel channel fitted tightly into head of frame, flush with top.

2.3 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

- A. Frame Finish: Factory primed and field finished.
- B. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- C. Fire-Rated Door Frames: Full profile/continuously welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C or NFPA 252 ("positive pressure fire tests").

2.4 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.5 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- B. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

- A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 71 00.

3.4 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire rated and non-rated.

1.2 RELATED REQUIREMENTS

- A. Section 08 12 13 - Hollow Metal Frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 81 00 - Fire Rated Glass

1.3 REFERENCE STANDARDS

- A. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- B. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Samples: Submit two samples of door veneer, 4 inch in size illustrating wood grain, stain color, and sheen.
- D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
- E. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
- B. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Veneer Faced Doors:
- B. Wood Veneer Faced Doors:
 - 1. Algoma Hardwoods Inc: www.algomahardwoods.com
 - 2. Graham Wood Doors: www.grahamdoors.com.
 - 3. Marshfield DoorSystems, Inc: www.marshfielddoors.com.
 - 4. VT Industries: www.vtindustries.com .
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 DOORS AND PANELS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

2.3 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.4 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Same species as face veneer.
 - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
 - 3. Veneer to be hot press applied to core.

2.5 ACCESSORIES

- A. Glazing Stops for Fire Rated Doors: Metal as required by manufacturer to achieve fire rating.

2.6 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Fit door edge trim to edge of stiles after applying veneer facing. No exposed cross banding.
- E. Bond edge banding to cores.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.

2.7 FACTORY FINISHING - WOOD VENEER DOORS

- A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
 - 1. Transparent:
 - a. System - TR-2, Catalyzed Lacquer.
 - b. Stain: As selected by Architect.
 - c. Sheen: Flat.
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with _____ sealer to match door facing.

2.8 ACCESSORIES

- A. Hollow Metal Door Frames: As specified in Section 08 12 13.
- B. Door Hardware: As specified in Section 08 71 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements and to requirements for fire rating label by UL or WH. Follow manufacturer's installation instructions for positive pressure doors.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

3.3 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling access door and frame units.

1.2 RELATED REQUIREMENTS

- A. Section _____: Openings in masonry.
- B. Section _____: Openings in partitions.
- C. Section 09 91 13 - Exterior Painting: Field paint finish.
- D. Section 23 33 00 - Air Duct Accessories: Access doors in ductwork.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.
- E. Project Record Documents: Record actual locations of each access unit.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

2.2 MANUFACTURERS

2.3 WALL AND CEILING MOUNTED UNITS

- A. Door and Frame Units: Formed steel.
 - 1. Door panels: 20 gage min. double sheet with integral non-combustible insulation filler.
 - 2. Sizes: As required to provide adequate access.
 - 3. Prime coat with baked on primer.
 - 4. Finish: Two coats baked enamel, color as selected.
- B. Non-Fire Rated Door and Frame Units in Walls:
 - 1. In Masonry:
 - a. Model DSC-214M manufactured by Karp Associates, Inc..
 - 2. In Gypsum Board on Steel Studs:
 - a. Model KDW manufactured by Karp Associates, Inc..
- C. Fire Rated Door and Frame Units in Walls:

1. In Masonry:
 - a. 1-1/2 hour B label fire rating.
2. In Gypsum Board on Steel Studs:
 - a. 1-1/2" hour B label fire rating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings are correctly sized and located.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings with plane of door and panel face aligned with adjacent finished surfaces. Secure rigidly in place.
 1. Set concealed frame type units flush with adjacent finished surfaces.
- C. Position units to provide convenient access to concealed equipment when necessary.
- D. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes hardware for wood steel and aluminum doors.
 - 1. Provide door gaskets, including weatherstripping and seals, and thresholds.
- B. Related Sections:
 - 1. Section 08 12 13 – Hollow Metal Door Frames.
 - 2. Section 08 14 16 - Flush Wood Doors.
 - 3. Section 08 16 13 – Fiberglass Doors.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A156.1 - Butts and Hinges.
 - 2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
 - 3. ANSI A156.3 - Exit Devices.
 - 4. ANSI A156.4 - Door Controls - Closures.
 - 5. ANSI A156.5 - Auxiliary Locks and Associated Products.
 - 6. ANSI A156.6 - Architectural Door Trim.
 - 7. ANSI A156.7 - Template Hinge Dimensions.
 - 8. ANSI A156.8 - Door Controls - Overhead Holders.
 - 9. ANSI A156.13 - Mortise Locks and Latches.
 - 10. ANSI A156.15 - Closer Holder Release Devices.
 - 11. ANSI A156.16 - Auxiliary Hardware.
 - 12. ANSI A156.18 - Materials and Finishes
 - 13. ANSI A156.23 - Electromagnetic Locks.
- B. Builders Hardware Manufacturers Association:
 - 1. BHMA Directory of Certified Products.
- C. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- D. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies.
 - 2. UL 305 - Panic Hardware.
 - 3. UL - Building Materials Directory.
- E. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.

1.3 PERFORMANCE REQUIREMENTS

- A. Fire Rated Openings: Provide door hardware listed by UL or Intertek Testing Services (Warnock Hersey Listed), or other testing laboratory approved by applicable authorities.
 - 1. Hardware: Tested in accordance with NFPA 252.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- C. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.
 - 1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information.
 - a. Type, style, function, size and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
- D. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.
- E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- F. Samples if Requested: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.
- G. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

- H. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of installed cylinders and their master key code.
- C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:
 - 1. ANSI A156 series.
 - 2. NFPA 80.
 - 3. UL 305.
- B. Furnish hardware marked and listed in BHMA Directory of Certified Products.
- C. Manufacturer: Obtain each type of hardware (ie., lock sets) from a single manufacturer, although several may be indicated as offering products complying with requirements.
- D. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced architectural hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor. Supplier is responsible for proper coordination of all finished hardware with related sections to insure compatibility of products.
- E. Fire Rated Openings: Provide hardware for fire rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.
- F. Where emergency exit devices are required on fire rated doors (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".
- G. Thru bolt all door closers and exit devices installed on wood doors.
- H. Unless otherwise specified, provide lever handle locksets.

- I. Provide and install tactile levers at the corridor side of lever sets for all mechanical and storage rooms in accordance with ANSI/ADA.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for purpose specified and indicated.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.
- C. Include persons involved with installation of doors, frames, and hardware.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.
- C. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.
- E. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

1.10 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
 - 1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
- C. Sequence installation to accommodate required utility connections.

- D. Coordinate Owner's keying requirements during course of Work.

1.11 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance materials.
- B. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following manufacturers:

Butt Hinges:	Ives
Continuous Hinges:	Ives
Locksets:	Falcon Lock Co.
Exit Devices:	Falcon Exit Devices
Closers:	LCN
Overhead Holders:	Glynn-Johnson
Kickplates:	Ives
Silencers:	Ives
Wall Stops:	Ives
Threshold & Weatherstrip:	National Guard Products
Power Supplies:	Falcon
Miscellaneous:	Schlage Electronics

2.2 COMPONENTS

- A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
 - 1. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
 - 2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.

3. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.
 4. Manufacturer's identification will be permitted on rim of lock cylinders only.
 5. Finishes: US32D/630 for all finished metal hardware items except as otherwise indicated. Door closers to be powder coated to match. Special rust inhibitor (SRI where indicated).
 6. Lockset Design: Lever handle design shall be similar to Dane as manufactured by Falcon Lock Co.
 7. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self tapping sheet metal screws, except as specifically indicated.
 8. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
 9. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru bolt or use sex screw fasteners.
 10. Electrical Devices: Make provisions and coordinate requirements for electrical devices and connections for hardware.
- B. Hinges and Butts: Template type, ANSI A156.7, complying with following general requirements unless otherwise scheduled.
1. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template produced units.
 2. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.
 3. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins.
 - b. Non-ferrous Hinges: Stainless steel pins.
 - c. Exterior Doors: Non-removable pins.
 - d. Out-swing Corridor Doors: Non-removable pins.
 - e. Interior Doors: Non-rising pins.
 - f. Tips: Flat button and matching plug, finished to match leaves.
 - g. Number of hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
 4. Acceptable Manufacturers.
 - a. Ives – 5BB Series
 - b. Hager – BB Series
 - c. McKinney – T Series

C. Aluminum Geared Continuous Hinges:

1. Hinge shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising. The door leaf and jamb leaf shall be geared together for the entire length of the hinge and joined by a channel. Hinge knuckle shall be monolithic in appearance. Continuous hinge with visible knuckle separations are not acceptable. Vertical door loads shall be carried on minimum 3/4" acetyl bearings through a full 180 degrees. Screw hole locations on door leaf and jamb leaf to be templated. All heavy-duty hinges (HD) shall have a minimum of 32 bearings over a 7-foot length.
2. Acceptable Manufacturers:
 - a. Ives
 - b. Select Products Ltd
 - c. Roton

D. Stainless Steel Pin and Barrel Continuous Hinges

Hinges shall be fabricated from 14 gauge, type 304 stainless steel with .025" diameter stainless steel pin. Provide twin self-lubricated nylon bearings at each knuckle. Hinge capable of supporting door weighing up to 600 lbs. and successfully tested for 1,500,000 cycles.

1. Acceptable Manufacturers:
 - a. Ives
 - b. Markar
 - c. Roton

E. Lock Cylinders and Keying:

1. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.
2. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either new or integrated with Owner's existing system.
3. Equip locks with Oak Security (J keyway) compatible cylinders for interchangeable core pin tumbler inserts to continue existing key system.
4. Furnish only temporary keyed inserts for the construction period, and remove these when directed.
5. Equip locks with cylinders that comply with performance requirements for Grade 1 cylinders as listed in ANSI A156, and are UL-listed.
6. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.
7. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

8. Permanently inscribe each key with number or lock that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".
 9. Key Material: Provide keys of nickel silver only.
 10. Key Quantity: Furnish 3 change keys for each lock; 5 master keys for each master system; 5 grandmaster keys for each grandmaster system; 6 construction keys and 6 control keys – construction and permanent.
 11. Furnish one extra blank for each lock.
- F. Locks, Latches and Bolts:
1. Cylindrical Locks - ANSI A156.2 Series 4000, Grade 1 Strength and Operational requirements. Meets A117.1 Accessibility Codes. Latch bolts shall be steel with minimum ½" throw, deadlocking on keyed and exterior functions. ¾" throw anti-friction latchbolt on pairs of fire doors. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame. Provide 5/8" minimum throw of latch and deadbolt used on pairs of doors.
 2. Mortise Locks – ANSI A156.13, Grade 1 Operational, ANSI/ASTM F476-76 Grade 30, UL listed. Levers shall be forged brass or bronze, cast stainless steel, KG lever design is wrought brass, bronze or stainless steel. Meets A117.1 Accessibility Codes. Steel Case with ¾" throw brass or stainless steel anti-friction latchbolt and a 1" throw brass or stainless steel deadbolt. Lock trim shall incorporate individual lever support springs in each rose or escutcheon. Lever connection by attaching threaded bushings tightened by a spanner wrench. Threaded set screws will not be accepted. Lock spindles shall be two independent inside and outside spindles to prevent manipulation of lock. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame.
 3. Lock design shall be Falcon T series "DANE" design
 4. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
 5. Lock Manufacturers: Subject to compliance with requirements, provide lockset products of the following approved manufacturers:
 - a. Falcon Lock Co. "MA/T Series"
 - b. Sargent Lock Co. "8200 Series/10 Line"
 - c. Best Access Systems "45H/9K Series"
 - d. Schlage Lock Co. "L9000 Series ND Series"
- F. CLOSERS AND DOOR CONTROL DEVICES
1. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.
 2. Closers: All door closers shall be of one manufacturer to provide for proper installation and servicing after installation. Closer shall carry a manufacturer's **TEN YEAR WARRANTY** for hydraulic units.
 3. Closer bodies shall be cast Iron with 1 ½" diameter bore and 11/16" diameter double heat treated pinion journal.
 4. Provide closers with solid forged steel main arms and factory assembled heavy duty forearms for parallel arm closers.
 5. All door closers shall pass UL10C positive pressure fire test.
 6. All closers shall meet ANSI A156.4 Grade 1.
 7. Furnish all drop plates, blade stop spacers and shoe supports as required for proper closer mounting.

8. Closers that incorporate Pressure Relief Valve technology (PRV) will not be accepted.
 9. Acceptable Manufacturers and Types:
 - a. LCN "4000 Series"
 - b. Sargent "281 Series" Less PRV
 - c. Corbin-Russwin "DC8000 Series"
- G. EXIT DEVICES
1. General: All devices shall be of one manufacturer to provide for proper installation and serving. Devices shall be non-handed and capable of direct field conversion for all available trim functions. All devices shall carry a three year warranty against manufacturing defects and workmanship.
 2. All closers shall meet ANSI A156.4 Grade 1.
 3. Furnish all exit devices with deadlocking latchbolts or guarded latch (GL) feature.
 4. Furnish all non-rated devices with cylinder dogging (CD) feature.
 5. Furnish all exit devices with metal end caps.
 6. Furnish removable mullions with key removable feature, where scheduled.
 7. Furnish cylinders with all lockable exit devices and mullions.
 8. Furnish required filler plates and shim kits for flush mounting of exit devices on all doors.
 9. Removable mullions shall be finished to match frame.
 10. Acceptable Manufacturers and Types:
 - a. Falcon Exit Devices – "25 Series"
 - b. Sargent Exit Devices – "8000 Series"
 - c. Von Duprin – "98/99 Series"
- H. STOPS AND BUMPERS
1. Furnish wall stops wherever lock trim strikes a wall or partition, as scheduled. Where practical, furnish concealed screw type with proper fastening to suit wall construction. Where wall bumper cannot be used, furnish overhead stop, unless otherwise scheduled.
- I. OVERHEAD STOPS AND HOLDERS
1. Overhead stops (and holders) shall be surface or concealed mounted in type and function as scheduled. Arms and channels shall be of bronze or stainless steel material. Template degree of opening for maximum permitted by door conditions.
 2. Acceptable Manufacturers:
 - a. Glynn Johnson
 - b. Rixson
 - c. Sargent
- J. DOOR TRIM UNITS
1. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops and similar units); either machine screws or self-tapping screws.
 2. Fabricate protection plates (armor, kick or mop) not more than 1-1/2" less than door width on stop side and not more than 1/2" less than door width on pull

side, x the height indicated. All protection plates shall have all edges beveled (B4E).

3. Metal Plates: Stainless steel, .050" (U.S. 18 ga.).
 4. All pull plates and handles to be thru-bolted. Install pull plate prior to push plate to conceal thru-bolts. Provide concealed fasteners for all push/pull applications.
5. Acceptable Manufacturers:
 - a. Ives
 - b. Rockwood
 - c. Quality

K. WEATHERSTRIP AND GASKETING

1. General: Except as otherwise indicated, provide continuous weather stripping at each leaf of every exterior door. Provide type, sizes and profiles shown or scheduled. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.
2. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by the manufacturer.
3. Acceptable Manufacturers:
 - a. National Guard Products.
 - b. Reese
 - c. Zero

L. THRESHOLDS

1. General: Except as otherwise indicated provide standard aluminum threshold unit of type, size and profile as shown or detailed.
2. Provide welded custom thresholds where scheduled and noted in the hardware sets. Provide cover plates where scheduled.
3. Provide thresholds that are 1" wider than depth of frame unless specified or detailed otherwise.
4. Acceptable Manufacturers:
 - a. National Guard Products
 - b. Reese
 - c. Zero

M. DOOR SILENCERS

1. All hollow metal frames shall have grey resilient type silencers. Quantity (3) on single doors and quantity (2) on pairs of doors.

N. ELECTRICAL HARDWARE

1. Where scheduled supply electrified exit devices that allow for remote retraction of latch bolts by use of a solenoid. Access control system will allow exit devices to be changed from exit only or latched to push-pull operation.
2. Furnish power transfers that are recessed into door and frame. Power transfers to allow electrical power to pass from door to frame without the use of door cords or transfer hinges.

3. Furnish power supplies or transformers to operate all electrified products. Exit device power supplies to have regulated output that is field selectable for either 24VDC @ 2 amps or 12VDC @ 4 amps. Standard input at 120VAC @ 1amp or 240VAC @ 0.5amp. Power Supplies to have five (5) knockout holes for conduit connection with terminal block that handles up to 14 gauge wire. Power supplies will handle up to 16 amp current inrush to retract exit device latch bolt.
4. Furnish wiring diagrams (riser and point to point) with theory of operation to electrical contractor for use in installing electrical hardware products.
5. Electrical contractor to run all wiring and make all final connections for electrified hardware. Hardware supplier shall be responsible to furnish all wiring diagrams to operate electrified hardware. Access control material and electrified hardware to interface at junction boxes.
6. Furnish wall magnets in sizes, types and voltages as scheduled. Where required by condition, extensions furnished as part of the manufacturer's approved assembly will be allowed. Where wall magnets are not practical, furnish SEH electronic hold open in conjunction with stop arm closer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.
- C. Verify electric power is available to power operated devices and is of correct characteristics.

3.2 INSTALLATION

- A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.
- B. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface

protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.

3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Supplier or Primary Hardware Manufacturer's Representatives inspect installation and certify hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4 CLEANING AND ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Check and adjust each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made.
- C. Clean adjacent surfaces soiled by hardware installation.
- D. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- E. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- F. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of

current and predictable problems (of substantial nature) in the performance of the hardware.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage hardware or hardware finish.

3.6 SCHEDULES

- A. The following hardware sets are intended to establish type and standard of quality when used together with this section requirements. Examine Drawings and Specifications and furnish proper hardware for door openings.

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Gypsum sheathing.
- F. Gypsum wallboard.
- G. Joint treatment and accessories.
- H. Soffit framing.
- I. Moisture resistant gypsum board.

1.2 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- B. Section 06 10 00 - Rough Carpentry: Building framing and sheathing.
- C. Section 07 21 00 - Thermal Insulation: Acoustic insulation.
- D. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- E. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.
- F. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- G. Section 09 90 00 - Painting and Coating

1.3 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- D. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
- E. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2009).
- F. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.

- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- J. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- K. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- L. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- M. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- N. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.
- O. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2007a (Reapproved 2011).
- P. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing Board; 2013.
- Q. ASTM C1325 - Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units; 2014.
- R. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- S. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2013.
- T. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- U. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2010.
- V. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- W. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- X. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- Y. GA-216 - Application and Finishing of Gypsum Board; 2013.
- Z. GA-600 - Fire Resistance Design Manual; 2015.
- AA. UL (FRD) - Fire Resistance Directory; current edition.

1.4 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies in conjunction with Sections 05 4000 and 09 1110 as follows:
 - 1. Fire Rated Partitions: As shown on drawings.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing, acoustic seals, and compression track.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.6 QUALITY ASSURANCE

- A. Manufacturer: company specializing in manufacturing products specified in this section with minimum ten years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section, with minimum ten years of documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
 - 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D. Fire Rated Assemblies: Provide completed assemblies (Tested rating determined in accordance with ASTM119) with rating as indicated on drawings.
 - 1. Fire Rated Partitions: UL listed assembly No. _____; ___ hour rating.
 - 2. Head of Fire Rated Partitions: UL listed assembly No. _____; ___ hour rating.
 - 3. Fire Rated Ceilings and Soffits: One (1) hour fire rating.
 - 4. Fire Rated Structural Column Framing: UL listed assembly No. _____; ___ hour rating.
 - 5. Fire Rated Structural Beam Framing: UL listed assembly No. _____; ___ hour rating.
 - 6. Fire Rated Shaft Walls: UL listed assembly No. _____; ___ hour rating.
 - 7. Fire Rated Area Separation Walls: UL listed assembly No. _____; ___ hour rating.

8. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.2 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 1. Clarkwestern Dietrich Building Systems LLC; ____: www.clarkdietrich.com/#sle.
 2. Dietrich Metal Framing; Product ____: www.dietrichindustries.com.
 3. Marino; ____: www.marinoware.com/#sle.
 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
 2. Studs: "C" shaped with flat or formed webs with knurled faces.
 3. Runners: U shaped, sized to match studs.
 4. Ceiling Channels: C-shaped.
 5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
- C. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.

2.3 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 1. CertainTeed Corporation; ____: www.certainteed.com/#sle.
 2. Georgia-Pacific Gypsum; ____: www.gpgypsum.com/#sle.
 3. National Gypsum Company; ____: www.nationalgypsum.com/#sle.
 4. USG Corporation; ____: www.usg.com/#sle.
 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Unfaced fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 4. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 5. Thickness:
 - a. Vertical Surfaces: 5/8".
 - b. Ceilings: 5/8 inch.
- C. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Ceilings, unless otherwise indicated.
 2. Thickness: 5/8" inch.
 3. Edges: Tapered.
 4. Products:
 - a. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Edges: Square.
 4. Glass Mat Faced Products:
 - a. CertainTeed Corporation; GlasRoc Brand.
 - b. Georgia-Pacific Gypsum; DensGlass Sheathing.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 ACCESSORIES

- A. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 inch. Product shall be formaldehyde free.
- B. Water-Resistive Barrier: As specified in Section 07 25 000.
- C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 1. Types: As detailed or required for finished appearance.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.
- G. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that project conditions are ready to receive work and opening dimensions are as indicated on shop drawings to commence.

3.2 EXISTING WORK

- A. Extend existing gypsum board installations using materials and methods as specified.
- B. Repair and remodel existing gypsum board assemblies which remain or are to be altered.

3.3 SHAFT WALL INSTALLATION

- A. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.4 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Install in accordance with ASTM C754.
 - 2. Coordinate location of hangers with other work.
 - 3. Install ceiling framing independent of walls, columns, and above ceiling work.
 - 4. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
 - 5. Laterally brace entire suspension system.
- C. Studs: Space studs at 16 inches on center.
 - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging. Provide extended leg ceiling runners with compressible fire rated fill.
- D. Install Flex-C Trac metal framing and accessories plumb, square, true to line, true to radius, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this section.
 - 1. Cut Flex-C Trac members by sawing or shearing: do not torch cut.
 - 2. Fasten Flex-C Trac members by welding or screw fastening, as standard with fabricator. Wire tying of Flex-C Trac members is not permitted.
 - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Located mechanical fasteners and install according to Flex-C Trac manufacturer's instructions with screw penetrating banding at every flange interval and joined members by not less than 8 exposed screw threads.
 - 3. Install Flex-C Trac members in one or multi piece lengths as specified.
 - 4. Splice Flex-C Trac segments by overlapping bands from one Flex-C Trac to another and attaching screwed fasteners at overlapping plates or flange intervals. Screw penetrations of not less than 3 exposed screw threads.
 - 5. Provide temporary bracing and leave in place until framing is permanent.
 - 6. Do not bridge building expansion and control joints with Flex-C Trac metal framing. Independently frame both sides of joints.
- E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- F. Blocking: Install wood blocking for support of:
 - 1. Wall mounted door hardware.
 - 2. Wood frame opening.
 - 3. Or any other materials requiring blocking. Coordinate blocking requirements with other contractors.

3.5 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place two beads continuously on substrate before installation of perimeter framing members.
 - 2. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, rough-in boxes, and other equipment.. Do Not seal penetrations scheduled to receive firestopping.

3.6 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
 - 1. Use screws when fastening gypsum board to metal furring or framing.
- B. Single-Layer Non-Rated: Install gypsum board horizontal, with ends and edges occurring over firm bearing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
 - 1. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Seal joints, cut edges, and holes with water-resistant sealant.
- E. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.

3.7 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart for exposed interior linear construction.
 - 2. Not more than 25 feet where ceramic wall tile is installed on an interior wall.
 - 3. Not more than 12 feet where ceramic wall tile is installed on an exterior wall, in direct sunlight or wet conditions.
 - 4. At metal door frames above each jamb.
 - 5. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.8 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 3. Level 3: Walls to receive textured wall finish.
 - 4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 5. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
 - 6. Level 0: Temporary partitions.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.

- C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.
- E. Exterior Sheathing Board
 - 1. Seal all joints with manufacturer recommended sealant.
 - 2. Completely cover each fastener with sealant.

3.9 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 24 00
CEMENT PLASTERING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cement plastering.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry
- B. Section 09 90 00 - Painting and Coating

1.3 REFERENCE STANDARDS

- A. ASTM C206 - Standard Specification for Finishing Hydrated Lime; 2014.
- B. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters; 2015.
- C. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2015b.
- D. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering; 2006 (Reapproved 2013).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data on plaster materials and trim accessories.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 MOCK-UP

- A. Mock-Up Panel: Construct a 4 foot wide by 8 foot high sample panel of plaster work at the jobsite demonstrating installation procedures, finish texture, and color. Show each phase of installation including framing and reinforcement.

1.7 FIELD CONDITIONS

- A. Interior Plaster Work: Maintain minimum ambient temperature of 50 degrees F during installation of plaster and until fully cured.

PART 2 PRODUCTS

2.1 CEMENT PLASTER APPLICATIONS

- A. Solid Plaster Base: Concrete masonry.
 - 1. Plaster Type: Jobsite mixed plaster.
 - 2. Number of Coats: One.
 - 3. First Coat: Apply to a nominal thickness of 1/4 inch.
 - 4. Second Coat: Apply to a nominal thickness of 1/4 inch.
 - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
 - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.

2.2 JOBSITE MIXED CEMENT PLASTER

- A. Materials:
 - 1. Lime: ASTM C206, Type S.
 - 2. Sand: Clean, well graded, and complying with ASTM C897.
 - 3. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.
- B. Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.
 - 1. First Coat Over Low Absorption Solid Base:
 - a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.
 - 2. Second Coat: Same mixture as first coat, without fiber reinforcement, except minimum 3 parts and maximum 5 parts sand.
 - 3. Finish Coat:
 - a. Minimum 1-1/2 parts and maximum 3 parts sand, per total volume of cementitious materials.

2.3 ACCESSORIES

- A. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces, complying with ASTM C932.
- B. Reinforcing Mesh: 4.5 oz/sq yd alkali-resistant mesh.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify concrete surfaces are flat, honeycombs are filled flush, and surfaces are ready to receive work of this section, and that there are no existing bituminous, water repellent, or form release agent coatings on concrete surfaces that may be detrimental to plaster bond.
- C. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

3.2 PREPARATION

- A. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- B. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.

3.3 MIXING

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Do not retemper mixes after initial set has occurred.
- D. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.4 APPLICATION

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Leveling Coat:
 - 1. Apply leveling coat to specified thickness.
 - 2. Fully embed reinforcing mesh in leveling coat.
- C. Finish Coats:
 - 1. Cement Plaster:
 - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
 - b. Apply desired surface texture while mix is still workable.

3.5 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

3.6 REPAIR

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.2 RELATED REQUIREMENTS

- A. Section 07 21 00 - Thermal Insulation: Acoustical insulation.
- B. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- C. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

1.3 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.
- E. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2008a.
- F. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- G. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- H. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; 2006.
- I. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.
- J. UL (FRD) - Fire Resistance Directory; current edition.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; 2003.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements: Submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, mechanical and electrical items installed in the ceiling, and indicate method of suspension where interference exists. Submit shop drawings for all custom shapes, clouds, and ceiling formations illustrating understanding of architect's intent. Notify architect in writing of any conflicts or dimensional changes.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Samples: Submit two samples 6 x 12 inch size illustrating material and finish of acoustical units.
- E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

- A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- C. Installer Qualifications: Company specializing in performing the work specified in this section with minimum five years documented experience.
- D. Conform to CISCA requirements.
- E. Fire Rated Floor Construction: Rating as indicated on Drawings.
 - 1. Tested Rating: Determined in accordance with ASTM E119.
- F. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- G. Single Source Responsibility: To obtain combined warranty for the suspension system and the acoustical panel, color match or ceiling panel and suspension system compatibility, all acoustical panel and suspension system components shall be produced and supplied by one manufacturer. Materials supplied by more than one manufacturer are not acceptable.
- H. Requirements of regulatory agencies: Codes and regulations of authorities having jurisdiction.
- I. Source quality control:
 - 1. Test reports: Manufacturer will provide test certification for minimum requirements as tested in accordance with applicable industry standards and/or to meet performance standards specified by various agencies.
 - 2. Changes from system: System performance following any substitution of materials or change in assembly design must be certified by the manufacturer.
 - 3. All ceiling panel cartons must contain UL label for acoustical compliance.
 - 4. All suspension system cartons must contain UL label for load compliance per ASTM C635.
- J. Warranty

1. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - a. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 - b. Grid System: Rusting and manufacturer's defects
 - c. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
2. Warranty Period Armstrong Humiguard:
 - a. Acoustical panels: Ten (10) years from date of substantial completion.
 - b. Grid: Ten (10) years from date of substantial completion.
 - c. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.
3. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.7 DELIVERY AND STORAGE OF MATERIALS

- A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements.
- B. Storage:
 1. Panels: Storage time of materials at the job site should be as short as possible and environmental conditions should be as near as possible to those specified for occupancy. Excess humidity during storage can cause expansion of material and possible warp, sag, or poor fit after installation. Chemical changes in the mat and/or coatings can be aggravated by excess humidity and cause discoloration during storage, even in unopened cartons. Cartons should be removed from pallets and stringers to prevent distortion of material. Long-term (6-12 months) storage under uncontrolled environmental conditions should be avoided.
 2. Suspension System: Store in manner that will prevent warping, scratches and damage of any kind.
- C. Handling: Handle in such manner to ensure against racking, distortion, or physical damage of any kind.
- D. Damaged or deteriorated materials should be removed from the premises. Immediately before installation, to stabilize tile and panels, store them at a location where temperature and humidity conditions duplicate those ambient during installation and anticipated for occupancy.

1.8 FIELD CONDITIONS

- A. Maintain uniform temperature and humidity prior to, during, and after installation. Do not use ceiling panels in extreme or continuous high humidity, or areas exposed directly to weather or water. Ceiling panels are sized and designed for use within the standard occupancy range of temperature and humidity, 65-85 °F, no more than 70% RH (relative humidity). Humidity can greatly affect product dimensional stability and sag resistance. Sag can become noticeable during periods of high humidity lasting only a few hours.
- B. Allow time for dimensional changes in ceiling panels stored at temperature/humidity conditions well outside of those recommended for service. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture

content equilibrium. With increases in temperature/humidity, these products expand (up to 1/64 in./ft. at 85 °F, 90% RH) and may not fit into a fixed grid. Conversely, with decreases, these products will be undersize, but expand to normal when standard ambient conditions return.

- C. For some pattern edge details, if perimeter panels must be cut smaller, the cut edge must be field-rabbited, or the wall angle must be lowered by reveal depth.
- D. Indicate formaldehyde VOC Classification, as tested by ASTM D5116 and according to standards established by the Collaborative for High-Performance Schools (CHPS), the State of Washington, the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), and the American National Standards Institute (ANSI) & The California Office of Environmental Health Hazard Assessment (COEHHA).
 - 1. "Formaldehyde-free"
 - a. The California Office of Environmental Health Hazard Assessment recognizes products with emissions of less than 3 parts per billion (ppb) as "formaldehyde-free".
 - 2. "Low Formaldehyde"
 - a. The Collaborative for High Performance Schools standard for VOC emissions limits the amount to 13.5ppb = 0.0135 ppm = 16.5µg/m³ as a Low Formaldehyde VOC Class panels.

1.9 SEQUENCING

- A. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustic units after interior wet work is dry, including residual moisture from plaster, concrete, or terrazzo work.

1.10 EXTRA MATERIALS

- A. Acoustic Ceiling Units: Furnish quantity of five percent of total acoustic unit area installed of each tile to Owner.
- B. Exposed Suspension System Components: Furnish quantity of two percent of total amount installed to Owner.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. USG: www.usg.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Acoustical Units - General: ASTM E1264, Class A.
 - 1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly as part of suspension system.
- C. Acoustical Tile Type ACT-1: Painted mineral fiber, ASTM E1264, Type IV Class A with to the following characteristics:
 - 1. Size: 24 x 48 inches.
 - 2. Thickness: 7/8 inches.
 - 3. Composition: Wet-formed mineral fiber.

4. Light Reflectance: .87 percent, determined in accordance with ASTM E1264.
5. Noise Reduction Coefficient (NRC): .80 determined as specified in ASTM E1264.
6. Articulation Class (AC): 170, determined in accordance with ASTM E1264.
7. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
8. Edge: Square.
9. Surface Color: White.
10. Surface Pattern: Fine Textured.
11. Products:
 - a. Basis of Design: School Zone Fine Fissured as manufactured by Armstrong World Industries, Inc..
12. Suspension System: Exposed grid Type 1.

2.2 SUSPENSION SYSTEMS

- A. Manufacturers:
 1. Same as for acoustical units.
 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; heavy-duty .
 1. Profile: Tee; 15/16 inch wide face.
 2. Finish: White
 3. Products:
 - a. Basis of Design: Prelude XL by Armstrong.

2.3 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.2 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M (seismic regulations), and manufacturer's instructions, and as supplemented in this section.
 1. Seismic Design Category C & D
 - a. End of main beams and cross tees must be tied together to prevent spreading.
 - b. Grid must not be attached to the wall molding.
 2. Seismic Design Category C

- a. Provide 3/8" clearance on all sides. Include 3/8" overlap of the grid on the wall molding.
- b. Minimum wall molding dimension: 7/8 inch.
3. Seismic Design Category D
 - a. Provide perimeter support wires.
 - b. Cable trays and electrical conduits must be independently supported and braced.
 - c. Ceiling areas over 1000 SF must have horizontal restraint wires or rigid bracing.
 - d. Ceiling areas over 2500 SF must have seismic separations joints or full height partitions.
 - e. Ceilings without rigid bracing must have 2" oversized trim rings for sprinklers and other penetrations.
 - f. Provide positive bracing when there are changes in ceiling plane.
 - g. Grid must be attached to two adjacent walls and opposite walls must have a 3/4" inch clearance.
 - h. Minimum wall molding dimension: 2 inch.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Do not eccentrically load system or induce rotation of runners.
- I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Install in bed of acoustical sealant.
 2. Use longest practical lengths.
 3. Overlap and rivet corners.
- J. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- K. Where installing sheet metal trim between two overlapping ceiling planes, provide a StrongBack Support (SB-12) as an attachment point for the lower ceiling plane. Span entire length of connection.

3.3 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

- F. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. When a tegular tile is required to be field cut, it must be cut with a tegular edge and exposed edges to be painted to match factory finish.
- G. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter molding.
- H. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

3.4 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.
- C. Suspended ceilings will be subject to special inspection (Seismic Design Category D)

3.5 SCHEDULE

- A. Refer to drawings for Finish Key and Schedule

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.2 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.
- B. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2009.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- D. ASTM F 970 - Standard Test Method for Static Load Limit; 2007.
- E. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2014).
- F. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.
- H. NFPA 258 - Standard Research Test Method for Determining Smoke Generation of Solid Materials; 2001.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Field verify actual measurements before fabrication; indicate recorded measurements on shop drawings. Indicate floor patterns, colors and seaming plan.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, 12" x 12" illustrating color and pattern for each resilient flooring product specified.

1.4 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Floor Finishes: Class i, when tested in accordance with ASTM E-648 Flooring Radiant Panel Critical Radiant Flux.

2. Base Material: Class i, minimum 0.45 watts/sq.cm. when tested in accordance with NFPA 253.
 - B. All materials to conform to ASTM E648, Critical Radiant Flux Class 1, ASTM E662 with a smock density of 450 or less.
 - C. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.
 - D. Installer Qualifications: Company specializing in performing tile installation, with minimum of 3 years of documented experience .
 - E. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Section 01 6000 - Product Requirements: Product storage and handling requirements.
- 1.6 FIELD CONDITIONS
- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.
- 1.7 CLOSEOUT SUBMITTALS
- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
 - B. Furnish 10 percent of installed vinyl tile flooring and base, 5 percent of installed linoleum flooring and 5 percent of rubber flooring of each type and color specified. Deliver all required overage and maintenance stock to owner's specified location prior to start of installation.
 - C. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials and suggested schedule for cleaning, stripping and re-waxing.

PART 2 PRODUCTS

2.1 TILE FLOORING

- A. Manufacturers:
 1. Basis of Design: Armstrong World Industries; Armstrong Commercial Flooring: www.armstrongflooring.com
 2. Tarkett; Johnsonite: www.johnsonite.com
 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Vinyl Composition Tile VCT 1:
 1. Manufacturers:
 - a. Armstrong World Industries, Inc; _____: www.armstrong.com/#sle.
 - b. Johnsonite, a Tarkett Company; _____: www.johnsonite.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Material: Comply with ASTM F 1066, of Class corresponding to type specified.
 3. Size: 12 by 12 inch.
 4. Thickness: 0.125 inch.
 5. Color: To be selected by Architect from manufacturer's full range.
 6. Static Load Limit: 125 lbs.sq.in., ASTM F970.
 7. Color(s): Refer to Finish Key and Schedule

8. Warranty: 5 year.

2.2 RESILIENT BASE

- A. Manufacturers:
 1. Basis of Design: Johnsonite, Inc; Product ____: www.johnsonite.com.
 2. Roppe Corp; Product ____: www.roppe.com.
 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Resilient Base: VB-1 ASTM F 1861, vinyl ; Coved (Resilient Floor), Toeless (Carpet).
 1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 2. Height: 6 inch.
 3. Thickness: 0.125 inch thick.
 4. Finish: Matte.
 5. Length: Roll.
 6. Color: Color as selected from manufacturer's standards.
 7. Accessories: Premolded external corners and end stops.

2.3 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Crack Bridging Membrane: 100% Solids, flexible Epoxy installed at 40 mils on 100% of the slab to receive tile
- D. Moldings, Transition and Edge Strips: Same material as flooring.
- E. Welding Rods: Color-match by flooring manufacturer.
- F. Sealer and Wax: Types recommended by flooring manufacturer.
- G. Crack Bridging
- H. Feature Strips: Of same material as tile

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710;

obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

- E. Verify that floor and lower wall surfaces are free of substances capable of impairing adhesion of new adhesive and finish materials.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface. Fill excessive low areas with self leveling flowable fill. Reduce ridges or bumps by grinding.
- B. Prohibit traffic until filler is fully cured.
- C. Clean substrate to remove adhesives, coatings or contaminants that will inhibit adhesion of the new floor system. Use chemical treatment or bead blast as dictated by the existing conditions and as recommended by the flooring manufacturer .
- D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.
- E. Wood Sub-floor: provide 1/4" plywood substrate over existing hardwood floors.

3.3 INSTALLATION - TILE FLOORING

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Fit joints and butt seams tightly.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- H. Install flooring in recessed floor access covers, maintaining floor pattern.
- I. At movable partitions, install flooring under partitions without interrupting floor pattern.
- J. Install feature strips where indicated.
- K. Mix tile from container to ensure shade variations are consistent when tile is placed.
- L. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

3.4 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Cove/Toeless Base: Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.
- E. Reveal Base: Miter all corners.

3.5 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal and maintain in accordance with manufacturer's instructions.

3.6 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 66 23
RESINOUS MATRIX TERRAZZO FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Epoxy matrix terrazzo with ground and polished finish.
- B. Divider strips.
- C. Precast epoxy terrazzo wall base.

1.2 RELATED REQUIREMENTS

- A. 04 20 00 - Unit Masonry
- B. Section 08 12 13 - Hollow Metal Frames

1.3 REFERENCE STANDARDS

- A. NTMA (GRAD) - Aggregate Gradation Standards; The National Terrazzo and Mosaic Association, Inc; current edition.
- B. NTMA (EPOXY) - Epoxy Terrazzo Specifications; The National Terrazzo and Mosaic Association, Inc; Current Edition located at www.ntma.com.
- C. NTMA (SPECS) - Terrazzo Specifications; The National Terrazzo and Mosaic Association, Inc.; current edition located at www.ntma.com.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for divider strips, control joint strips, expansion joints, and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.
- C. Shop Drawings: Indicate divider strip and control and expansion joint layout, and details of adjacent components. For precast units, detail profile and anchorage requirements.
- D. Samples: Submit two samples, 12 inch by 12 inch in size illustrating color, chip size and variation, chip gradation, matrix color, and typical divider strip.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with NTMA recommendations as posted at their web site at www.ntma.com unless more stringent requirements are specified.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 - 1. Minimum five years of documented experience.
 - 2. Associate member firm of the National Terrazzo and Mosaic Association, Inc.
- C. Surface Burning Characteristics: When tested in accordance with ASTM-D-635, the Epoxy terrazzo shall comply with the following value: Self-Extinguishing, extent of burning 0.25 inches maximum. ASTM D-648, Critical radiant flux, 1.0.

- D. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum of 10 years of documented experience
 - 1. Submit proof of Associate membership in NTMA.
- E. Installer Qualifications: Company specializing in performing the type of work specified in this section.
 - 1. Minimum ten years of documented experience.
 - 2. Approved by matrix manufacturer.
 - 3. Contractor member of the National Terrazzo and Mosaic Association, Inc.
- F. Single Source Responsibility: To obtain combined warranty for the installed flooring system from manufacturer; obtain primary epoxy terrazzo flooring system materials including membranes, primers, moisture vapor primers, resins and hardening agents from a single manufacturer with proof of NTMA membership. Obtain aggregates, divider strips, sealers and cleaners from source recommended by primary materials manufacturer.
- G. Warranty: Installer to warrant installation for two years upon completion of work in this Section for defects in workmanship.

1.6 MOCK-UP

- A. Section 01 40 00 - Quality Requirements: Requirements for mock-up.
- B. Construct mock-up of terrazzo illustrating appearance of finished work in each configuration required. Size mock-up to be not less than 3 by 3 feet.
- C. Locate where directed by Architect..
- D. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Products Requirements: Product storage and handling requirements.
- B. Store terrazzo materials in a dry, secure area.
- C. Maintain minimum temperature of 60 degrees F.
- D. Keep products away from fire or open flame.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-i installation meetings.
- B. Convene minimum one week prior to commencing work of this section.

1.9 FIELD CONDITIONS

- A. Do not install terrazzo when temperature is below 50 degrees F or above 90 degrees F.
- B. Maintain ambient and substrate temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.
- C. Prior to and during installation, the terrazzo contractor shall verify that the dew point is at least 5 degrees Fahrenheit less than the slab and air temperature.
- D. Provide ambient lighting level of 50 ft candles, measured at floor surface.

1.10 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

- B. Coordinate placement of terrazzo divider strips with location of mechanical and electrical access covers, floor mat frames, and other items built in to terrazzo.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Terrazzo & Marble Supply Companies; Terroxy Resin Systems: www.tmsupply.com. or Equal
- B. Other Acceptable Manufacturers - Resinous Matrix Terrazzo Flooring:
 - 1. Key Resin Company: www.keyresin.com.
 - 2. Sherwin-Williams Company: General Polymers Brand: www.generalpolymers.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
 - 4. Warranty: Manufacturer's warranty

2.2 EPOXY MATRIX TERRAZZO APPLICATIONS

- A. Floors:
 - 1. Thickness: 3/8 inch, nominal.
 - 2. Color(s): Match existing.
 - 3. Aggregate Type: TBD.
 - 4. Aggregate Size: TBD.
- B. Wall Base:
 - 1. Thickness: Same as floors.
 - 2. Style: Coved.
 - 3. Color(s): Same as adjacent floor.
 - 4. Aggregate Type and Size: Same as floors.

2.3 MATERIALS

- A. Epoxy Matrix Terrazzo: Aggregate and matrix mix applied to substrate, troweled flat, and ground smooth.
 - 1. Mix Proportions: As required to achieve appearance specified.
- B. Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
- C. Aggregate: Type as indicated; sized in accordance with NTMA aggregate gradation standards; color(s) as indicated, uniform in color.
- D. Aggregate: Crushed marble, granite, and glass, size in accordance with NTMA Plate of standard gradation and uniform coloration.

2.4 ACCESSORIES

- A. Divider Strips: 1/8 inch thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
- B. Control Joint Strips: 1/8 inch nominal width zinc exposed top strips, zinc coated steel concealed bottom strips, 1/8 inch wide neoprene filler strip between vertical strips, with anchoring features.
- C. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.

- D. Primer: 100% solids epoxy primer as manufactured by epoxy matrix manufacturer is required.
- E. Crack Bridging Membrane: 100% solids, flexible epoxy installed at 40 mils installed on 100% of slab to receive epoxy terrazzo.
- F. Patching and Fill Material: 100% epoxy fill and selected aggregates as recommended by epoxy matrix manufacturer.
- G. Base Cap, Base Divider Strip, and Separator Strip: Match divider strips.
- H. Cleaner: Neutralizing liquid type, pH of 7.
- I. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components.
 - 1. Products:
 - a. Terrazzo & Marble Supply Companies; T-Rx: www.tmsupply.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive terrazzo.
- C. Saw cutting of concrete control joints must be done between 12 and 24 hours after placement of the structural concrete and at a frequency and depth meeting ACI recommendations
- D. Slab on grade concrete to have an efficient moisture vapor barrier directly under the concrete slab. Moisture vapor barrier shall not be punctured and shall be sealed with a vapor barrier grade flashing tape at all terminations, penetration and seams.
- E. Do not begin terrazzo work until concrete substrate has cured 28 days, minimum.
- F. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of materials to sub-floor surfaces.
- G. Verify that concrete sub-floor surfaces are ready for terrazzo installation by testing for moisture vapor emission, internal relative humidity, and alkalinity; obtain instructions if test results are not within limits recommended by terrazzo materials manufacturer.

3.2 PREPARATION

- A. Clean substrate of foreign matter.
- B. Prepare concrete subfloor by shot blasting surface in accordance with manufacturer's instructions but not less than CSP 3 profile according to International Concrete Repair Institute Guideline No. 03732.
- C. Prepare wood subfloor, tape joints, and apply subfloor joint filler.

3.3 INSTALLATION

- A. Install divider and control joint strips in adhesive setting bed without voids below strips or mechanically anchor strips as required to attach strips to substrate.

- B. Install divider and control joint strips straight and flat to locations indicated.
- C. Install base and border divider and control joint strips to match floor pattern.
- D. Install terminating cap strip at top of base; attach securely to wall substrate.
- E. Place terrazzo mix over substrate to thickness indicated.
- F. Expansion-Joint (isolation) strips: Separate double L-Type, positioned back to back with a minimum 1/8" to 1/4" width between. Fill areas between strips with semi flexible joint filler. Filler to match adjacent terrazzo matrix. Match material, thickness and color of the dividers strips and depth required for topping thickness indicated.
- G. Detail strip layout according to NTMA Guidelines.

3.4 APPLICATION - TERRAZZO

- A. Place terrazzo mix over prepared substrate to thickness indicated.
- B. Flush Vertical Base: Bond topping to wall.

3.5 CURING

- A. Close area to allow undisturbed curing.

3.6 FINISHING

- A. Finish terrazzo to a 200 grit finish and meeting NTMA requirements.
- B. Produce terrazzo finish surface to match approved mockup, with 70 percent chip exposed.
- C. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using a wet method or using a dry grinder with vacuum to control dust to a 120 grit finish prior to grouting.
- D. Cleanse: Clean the floor with water and rinse. Remove excess rinse water by wet vacuum and repeat process if necessary to remove all water and grinding dust. Allow the floor to completely dry before continuing with grouting.
- E. Apply grout to fill voids exposed from grinding.
- F. Remove grout coat by grinding, using a fine grit abrasive and polish to a minimum 200 grit.
- G. Hand grind vertical and curved surfaces similarly.

3.7 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.
- C. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

3.8 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final Cleaning.
- B. Scrub and clean terrazzo surfaces with neutral pH cleaner in accordance with manufacturer's instructions. Let dry.
- C. Immediately after terrazzo has dried, apply a minimum of 2 coats of sealer in accordance with manufacturer's instructions.

- D. Polish surfaces in accordance with manufacturer's instructions.

3.9 SCHEDULE

- A. Refer to Drawing ES-A9.1 for Finish Key and Schedules

3.10 PROTECTION

- A. Protect finished terrazzo from damage due to subsequent construction until Date of Substantial Completion.
- B. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In all areas, paint shop-primed items.
 - c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
 - d. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - e. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically so indicated.
 - 6. Glass.

1.2 RELATED REQUIREMENTS

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 21 16 - Gypsum Board Assemblies
- C. Section 09 24 00 - Cement Plastering

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.
- E. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; 2006.
- F. PDCA (MAN) - Architectural Specification Manual; 1986.
- G. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings; Fourth Edition.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products, including VOC content.
 - 1. Submit a list of comparable materials, including identifying product names, numbers, and catalogue data sheets.
- C. Samples: Submit three painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on appropriate substrate material, 9 x 12 inch in size.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Notify Architect in writing of any anticipated problems that might arise from using specified coating systems with substrates.
- F. Upon request from other trades, furnish information on characteristics of finish material proposed for use, to ensure compatible prime coats are used.
- G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Section 01 70 00 - Execution and Closeout requirements: Spare parts and maintenance products.
 - 2. Extra Paint and Coatings: 1 gallon of each color; store where directed.
 - 3. Label each container with color, type, texture, and room locations in addition to the manufacturer's label.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Coolers must be shut down for at least 7 days during application process.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for paints and coatings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Manufacturers: Paints, Transparent Finishes, Stain, Primer Sealers, Block Filler and Field Catalyzed Coatings:
 - 1. Sherwin Williams: www.sherwin-williams.com (Bases of Design)
 - 2. Benjamin Moore & Co: www.benjaminmoore.com/#sle.
 - 3. PPG Paints: www.ppgpaints.com/#sle.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Flammability: Comply with applicable code for surface burning characteristics.

2.3 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
1. Two top coats and one coat primer.
 2. Primer(s): As recommended by manufacturer of top coats.

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.

2. Plaster and Stucco: 12 percent.
3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
6. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

- A. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects. Patch, repair and sand smooth all cracks, protrusions and blemishes in the surface of existing substrates. Remove all unused accessories such as nails, hooks and fasteners.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces, with shellac, that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Back prime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.
- I. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Asphalt, Creosote, or Bituminous Surfaces to be Painted: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- K. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.
- L. Concrete Floors and Traffic Surfaces to be Painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- M. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- N. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- O. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

- P. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- Q. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- R. Back prime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.
- S. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- T. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- U. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.
- V. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- W. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with heavy coat of clear sealer immediately upon delivery of job.
- X. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
- Y. Previously Painted Metal Surfaces: Prior to finishing, wash services with soluvent and remove grease and dirt.

3.3 EXISTING WORK

- A. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.

3.4 APPLICATION

- A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- B. Apply products in accordance with manufacturer's instructions.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than proceeding coat unless specified otherwise.
- E. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- F. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.

- G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- H. Sand wood and metal surfaces lightly between coats to achieve required finish.
- I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- J. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- K. Finishing Mechanical and Electrical Equipment:
 - 1. Refer to Section 22 05 53 for schedule of color coding and identification banding of equipment, duct work, piping and conduit.
 - 2. Paint shop primed equipment.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports - except where items are shop finished.
 - 5. Paint interior surfaces of air ducts and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
 - 6. Paint exposed conduit and electrical equipment occurring in finished areas.
 - 7. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - 8. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated.
 - 9. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.
- B. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- C. Owner will provide field inspection.

3.6 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.7 SCHEDULE - EXTERIOR SURFACES: ALL MATERIALS ARE BASED ON SHERWIN WILLIAMS UNLESS NOTED OTHERWISE.

- A. Concrete, Concrete Block, Brick Masonry: Finish all surfaces exposed to view.
 - 1. One coat of Preprite Block Filler (B25W25) @ 8.0 MDFT.
 - 2. Two coats of Loxon Masonry Coating (A24WA351) @ 3.7 MDFT.
- B. Gypsum Board, Cement Plaster Soffits: Finish all surfaces exposed to view.
 - 1. One coat of Loxon Masonry Primer (A24W300) @ 3.2 MDFT.
 - 2. Two coats of Loxon Masonry Coating (A24WA351) @ 3.7 MDFT.
- C. Steel - Exposed steel lintels, Overhead doors, Frames, other Ferrous metal:

1. One coat Kem Bond HS Primer (B50 Series) DFT.
 2. Two coats Steel-Master 9500 Silicone Alkyd (B56-300 Series).
 3. Application: Preparation and prime coat is to be applied in factory by steel fabricator.
- D. Steel - Exposed steel columns and beams:
1. Minimum surface preparation is to meet SSPC-SP6.
 2. Prime coat Kem Bond HS Primer (B50 Series) @ 2.0-4.0 MDFT.
 3. Two coats Steel-Master 9500 Silicone Alkyd (B56-300 Series).
 4. Application: Preparation and prime coat is to be applied in factory by steel fabricator.
- E. Steel - Galvanized:
1. Two coats of Sher-Cryl HPA High Performance Acrylic (B66-300 Series) @ 2.5-4.0 MDFT.
 2. Application: Preparation and prime coat is to be applied in factory by fabricator.
- F. Galvanized Steel: Finish all surfaces exposed to view.``
- 3.8 SCHEDULE - INTERIOR SURFACES: ALL MATERIALS ARE BASED ON SHERWIN WILLIAMS UNLESS NOTED OTHERWISE.
- A. Concrete Block:
1. One coat Preprite Block Filler (B25) DFT- 8.0.
 2. Two coats Harmony "0 VOC-Silica Free - Antimicrobial" Latex Semi-Gloss (B10) @ 1.6 MDFT per coat.
- B. Concrete:
1. One coat Preprite Masonry Primer (B28W300) @ 3.0 MDFT.
 2. Two coats Harmony "0 VOC-Silica Free - Antimicrobial" Latex Semi-Gloss (B10) @ 1.6 MDFT per coat.
- C. Concrete Floors (Lt. - Med. Duty):
1. One coat ArmorSeal 1K Clear Water Based Urethane Floor Enamel (b65c775) reduced 10% by volume with water @ 1.5-3.0 DMFT.
 2. Two coats ArmorSeal 1K Clear Water Based Urethane Floor Enamel (b65c775) unreduced @ 1.5-3.0 MDFT per coat.
- D. Structural Steel and Metal - Steel access doors and frames, hollow metal doors and frames, all new removable mullions, stair railings, hollow metal Windows frames, new fire extinguisher cabinets:
1. One coat Kem Bond HS Primer (B50 Series) @ 2.5-5.0 MDFT.
 2. Two coats DTM Acrylic Semi-Gloss Coating (B66-200) @ 2.5-5.0 MDFT per coat.
- E. Galvanized Metal: Exposed miscellaneous metal, exposed ducts, conduits, mechanical and electrical devices.
1. One coat DTM Acrylic Primer/Finish (B66W1) @ 2.5-5.0 MDFT.
 2. Two coats DTM Acrylic Semi-Gloss Coating (B66-200) @ 2.5-4.0 MDFT per coat
- F. Aluminum - Mill Finish:
1. Two coats DTM Acrylic Gloss Coating (B66-100) @ 2.5-4.0 MDFT per coat
- G. Steel - Exposed steel lintels, Overhead doors, Frames, other Ferrous metal:
1. One coat Kem Bond HS Primer (B50 Series) DFT.
 2. Two coats Steel-Master 9500 Silicone Alkyd (B56-300 Series).
 3. Application: Preparation and prime coat is to be applied in factory by steel fabricator.
- H. Gypsum Board and Plaster Walls:
1. All interior drywall gypsum board wall surfaces for a painted finish. Inspect per Article 3.01. (Spot prime all joints and spots with primer first)
 - a. One coat Harmony Low Odor Primer (B11) DFT- 1.0.

- b. Two coats Harmony "0 VOC - Silica Free - Antimicrobial" Latex Eggshell (B9) @ 1.6 MDFT per coat.
- I. Gypsum Board and Plaster Ceilings:
 - 1. All interior drywall gypsum board wall surfaces for a painted finish. Inspect per Article 3.01. (Spot prime all joints and spots with primer first)
 - a. One coat Harmony Low Odor Primer (B11) DFT- 1.0.
 - b. Two coats Harmony "0 VOC - Silica Free - Antimicrobial" Latex Eggshell (B05) @ 1.7 MDFT per coat.
- J. Wood - Painted:
 - 1. One coat PrepRite Classic Interior Latex Primer (B28W1010 @ 1.6 mdft.
 - 2. Two coats ProMar 200 Interior Latex Semi-Gloss (B31-2200) @ 1.5 MDFT per coat.

END OF SECTION

SECTION 10 11 01
VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Markerboards and Tackboards.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 09 22 16 - Non-Structural Metal Framing: Concealed supports in metal stud walls.
- C. Section 09 21 16 - Gypsum Board Assemblies: Concealed supports in metal stud walls.
- D. Section 09 90 00 - Painting and Coating: Finishing of frame .

1.3 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- B. ANSI A208.1 - American National Standard for Particleboard; 2009.
- C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.
- D. ASTM C36/C36M - Standard Specification for Gypsum Wallboard; 2001.
- E. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012.
- F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- H. ASTM F793 - Standard Classification of Wall Covering by Use Characteristics; 2010a.
- I. PS 1 - Structural Plywood; 2009.
- J. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- K. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.
- D. Samples: Submit two samples 2 by 2 inch in size illustrating materials and finish, color and texture of chalkboard, markerboard, tackboard, tackboard surfacing, and trim.
- E. Maintenance Data: Include data on regular cleaning, and stain removal .

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for chalkboard and markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Visual Display Boards:
 - 1. Claridge Products and Equipment, Inc; Series 1: www.claridgeproducts.com.
 - 2. Polyvision Corporation (Nelson Adams): www.polyvision.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 VISUAL DISPLAY BOARDS

- A. Markerboards: Porcelain enamel on steel, laminated to core.
 - 1. Color: As selected from manufacturer's full range.
 - 2. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .
 - 3. Core: Particleboard, 1/2 inch thick, laminated to face sheet.
 - 4. Backing: Aluminum sheet, laminated to core.
 - 5. Magentic surface.
 - 6. Size: As indicated on drawings.
 - 7. Frame: Extruded aluminum, with concealed fasteners.
 - 8. Frame Profile: 1 1/2" wide perimeter trim
 - 9. Frame Finish: Anodized, natural.
 - 10. Accessories: Provide map rail, flag holder, and cleaning instruction plate.
 - 11. Chalk Tray: Chalktrough with end closures.
- B. Tackboards: Vinyl coated fabric roll stock, conforming to the following.
 - 1. Fabric: Vinyl coated fabric.
 - 2. Color: As selected from manufacturer's full range.
 - 3. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
 - 4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 - 5. Size: As indicated on drawings.
 - 6. Frame: Same type and finish as for markerboard.
- C. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
 - 1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
 - 2. Configuration: As indicated on drawings.

2.3 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Vinyl Coated Fabric: ASTM F793 Category VI.
- C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- D. Aluminum Sheet Backing: 27 gage, 0.014 inch thick.
- E. Adhesives: Type used by manufacturer.

2.4 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall, full width of frame.
- B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail.
- C. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- D. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board .
- E. Cleaning Instruction Plate: Provide instructions for chalkboard cleaning on a metal plate fastened to perimeter frame near chalkrail.
- F. Chalk/Marker Tray: Aluminum, manufacturer's standard extruded profile closed ends; concealed fasteners, same finish as frame.
- G. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.

3.3 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION