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APPENDICES
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INTRODUCTION
The Charlotte-Mecklenburg Schools (CMS) Architects and Engineers Design Guide has been developed to assist in the planning and design of new, expanded, or renovated facilities and has been organized to mirror CSIs format. It is not intended to place limits on the Designers’ creativity and resourcefulness. Rather, it reflects past experience with similar projects and/or systems, products, or components. The CMS A/E Guide is to be applied by the Designer as necessary to accomplish a solution to the project utilizing sound architectural and engineering judgment and practices.

The CMS System consists of 175+ schools, over 500 buildings, more than 22 million square feet and 5,000 +/- acres. Its building program is expanding at a steady pace to meet the needs of Mecklenburg County. The need to develop building standards is a natural process that follows in an expansive building program. CMS’s AE Guide is a collection of these building standards to guide the architect with basic design requirements. The primary intent of these guidelines will be to make CMS’s facilities equitable, easier to build and maintain.

The designer should receive from CMS the current version of the following documents at the beginning of each project: AE Guideline, Master Specifications and Facility Program for that particular facility.

Should the project design vary from the CMS A/E Guide, or if the Guidelines do not align with the problem as understood by the designer, then it must be identified with the owner for clarification or direction. The designer is required to identify any deviations to the CMS A/E Guide immediately, and resolve them before proceeding with the next phase of the project.

Technical specifications should be prepared in conformance with the most recent edition of the CMS Master Specification. The architect/engineer should bring variations and additions between the proposed project specification and the Master Specification to the attention of CMS as early as possible. Pre-bid substitution requests which pertain to specific sections of the A/E Guide and which are proposed to be accepted by the architect/engineer, should be submitted to CMS for written approval prior to the A/E’s formal approval. All post-bid substitution which varies in character from the approved specification should be brought to CMS’s attention.

There are many products and specifications included in a project that are not addressed in the CMS Master Specification. CMS approval or disapproval for any item covered or not covered in the CMS Master Specification is not required if, in the architect/engineer’s judgment, the request for substitution should be denied.

The designer is reminded to refer to NC General Statute 133-3 for current regulations regarding specifications to carry competitive materials. It is the designer’s responsibility to evaluate different products or proposed substitutions, and request the owner’s concurrence before bidding the project.

It is the intent of CMS to update and improve the A/E Design Guide periodically. Comments and recommendations from designers will be considered for future revisions.

1. GENERAL
1.1 Refer to CMS Facility Programs for all attributes of spaces. In all cases, where high ceilings occur, particular attention must be given to maintenance of space, including light fixture lamping, window cleaning, etc.
1.2 Refer to sheet name and numbering standards, See Appendix 1.2
1.3 All major entrances are to be covered.
1.4 Main entrance ramps shall be of such width and appearance that they are the main and preferred route of travel for all.

2. NOT USED

3. CONCRETE
3.1 FLOOR SLABS (unless otherwise recommended by Soils and/or Structural Engineer):
3.1.1 Slabs not to bear on grade beams, walls or piers.
3.1.2 The following surfaces, as well as other exterior concrete surfaces that may become wet shall receive a non-slip, broom finish: ramps, walks, loading docks, aprons, or as required by ADA for accessibility.
3.1.3 At slab edge of walls utilize 15 mill vapor barrier or black tar paper as the bond breaker in lieu of ½” expansion joint material. Consult with structural engineer for recommended method.
3.1.4 At thick set tile locations (kitchen, toilets, etc.) slab shall be depressed 3”.

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3.1.5 The foundation type and allowable soil bearing pressure shall be determined with the assistance of a qualified geotechnical engineer.

4. MASONRY

4.1 GENERAL
4.1.1 Refer to the National Concrete Masonry Association and the Brick Institute of America for detailing of masonry walls.
4.1.2 Particular attention should be paid to details and joints to minimize contraction cracks. Clearly indicate on the drawings where control joints are necessary. Provide control joint covers at control joints in circulation areas.
4.1.3 Use non-corrosive ties to prevent spalling of brick veneer.
4.1.4 Do not use a water repellent coating unless approved by the Owner.
4.1.5 Indicate precast concrete cap at exterior masonry screen walls (no rowlock terminations).
4.1.6 Do not use colored mortar unless approved by the Owner.
4.1.7 Interior CMU walls: Provide special shape, bull-nose corner masonry units in traffic areas. Base and ceiling CMU unit shall remain square for cove base and ceiling grid installation.
4.1.8 When expansion joint metal covers are used inside or exterior, they shall be vandal resistant.
4.1.9 At new construction, field masonry to be standard wire cut, running bond. No glossy finishes. Rowlock and soldier course accents may be used at limited locations. Brick colors to be limited to red, brown, or neutral light brown/beige. Concrete masonry units (for example, split-face units) may be used as an exterior accent material. Do not use light colors at base of building.
4.1.10 Minimize exterior brick extrusions to a ½” maximum.

4.2 PROCESS OF MASONRY SELECTION
4.2.1 Submit unit masonry samples for each type brick unit required (full range of exposed color and texture).
4.2.2 The contractor shall erect sample panels of exterior materials proposed from above selection. The initial, selected samples must be on site when mock-up panel is reviewed.
4.2.3 The architect should recommended samples to be approved by the owner.
4.2.4 At the same time all other exterior samples are proposed and recommended for approval.
4.2.5 Sample panels that are approved are marked and maintained until the building is completed. CMS approval will not be given if approved samples are not available on site.
4.2.6 The sample panels are also used as a quality standard to judge the masonry of the actual construction.

5. METALS

5.1 METAL FABRICATIONS
5.1.1 Ladders, ships ladders and railings
5.1.1.1 Under no circumstance will any roof access be provided that may be used by students.
5.1.1.2 Where ladders are used, they should be provided in storage rooms or other spaces that can be secured.
5.1.1.3 Interior ladders, where provided for roof or mechanical mezzanine access, shall be limited to ships ladders.
5.1.1.4 Where space and economy allow, stairs are preferred to ladders.
5.1.1.5 Handrails are to be provided on each side of ships ladders. The ships ladder assembly is to be an aluminum ladder including handrails designed to be permanently attached at the top and bottom. Ships ladders are not to extend beyond a twenty (20) feet in height. The ships ladder is to have a 60% slope and is to be used to service roofs via a roof hatch.
5.1.1.6 External ladders from grade for access to roof are not permitted for security and safety reasons. Exterior ladders used to access one roof level from another roof level are permitted if no other means of accessing that roof level can be provided.
5.1.1.7 Where vertical ladders are used, extended handrails should be provided where applicable. A cage is required for all heights above twenty (20) feet. Ships ladders are to have deeply serrated treads for non-slip safety.
5.1.1.8 Finishes are to be mill finish on all aluminum components.
5.1.1.9 Hasps are to be provided for roof scuttles.
5.1.1.10 Acceptable exterior railing finishes shall be hot dipped galvanized steel, aluminum or stainless steel. Acceptable interior railing finishes shall be painted ferrous metal or aluminum.
5.1.1.11 If roof top HVAC units are used, provide an over-sized roof hatch to allow heavy equipment access to the roof, using a pedestal-mounted (on roof) hoist system. Verify with CMS design manager for location and applicability.

5.2 ROOF STRUCTURE
5.2.1 Structural frame for roofs shall be sloped to drain.
5.2.2 Minimize the use of tapered insulation.
5.2.3 Do not cover exterior expansion joints with downspouts.
5.2.4 Preference to not have internal roof drains, utilize scuppers and downspouts.

6. WOODS, PLASTICS AND COMPOSITES

6.1 GENERAL
6.1.1 Countertops shall be a plastic laminate material with post-chamfer hardwood edge banding or solid phenolic. Finish options to be selected by the Architect and approved by the Owner.
6.1.2 Select construction and finish materials for durability. Only cabinet plywood, not particleboard shall be used. Indicate solid 3/8” minimum wood edge banding on wood-faced shelves, doors and drawers.
6.1.3 Use five knuckle butt hinges. Do not use Euro-style cabinet hinges.
6.1.4 Design cabinet door width to prevent warping.
6.1.5 Provide 3/8” +/- gaps between doors and/or drawers to improve the durability of the product.
6.1.6 In new construction use birch or oak veneer throughout, except in the media center. The Media Center circulation desk shall coordinate with the bookcases.
6.1.7 Provide mailroom casework. See Appendix 6.1.7
6.1.8 Provide work table, see appendices. See Appendix 6.1.8

6.2 ELEMENTARY AND K8 SCHOOLS
6.2.1 Casework shall be constructed with birch or oak veneer plywood with clear finish with 3/8” min. matching wood edge banding on shelves, doors and drawers. Use heavy-duty butt hinges or heavy-duty wrap around hinges.
6.2.2 Reception desk shall be constructed utilizing plastic laminate(s).
6.2.3 Provide casework in each elementary classroom. All classroom casework locks shall be keyed the same. See Appendix 6.2.3.
6.2.4 Provide storage cubbies in each elementary classroom, see appendices. See Appendix 6.2.4
6.2.5 Provide locks on wardrobes in classrooms which are to be keyed alike.
6.2.6 Provide anti-tipping shelf clips for adjustable shelving.

6.3 MIDDLE AND HIGH SCHOOLS
6.3.1 Casework in all areas (except Science Classrooms) shall be plastic laminate covered MDF with solid 3mm thick PVC edging and heavy-duty butt hinges.
6.3.2 Casework in Science Classrooms shall be veneer plywood with solid wood facing. Countertops to be acid/alkali resistant.
6.3.3 Casework in parent centers, workrooms, lounges and reception areas shall be plastic laminate covered MDF with solid 3mm thick PVC edging and with heavy-duty five knuckle hinges.
6.3.4 Provide locks on wardrobes in classrooms which are to be keyed alike.

6.4 BLOCKING
6.4.1 Blocking shall be provided in the wall where required to mount grab bars, handrails, casework, tack and marker boards, monitors, flag holder, wall stops and etc. Use fire retardant wood where required.

7. THERMAL AND MOISTURE PROTECTION

7.1 INSULATION AND FIREPROOFING
7.1.1 The Architect shall specify appropriate insulation and fireproofing to provide a safe, energy efficient, and quiet school environment that meets or exceeds code requirements. Insulation values shall be at least equal to those listed in the Energy Code. When possible, and at a reasonable cost, minimum requirements should be exceeded. Copies of the energy requirements shall be provided to the Owner during the Design Development phase.
7.1.2 Specify fireproofing (when required) that is approved for safe application in plenum spaces. Do not design roof systems that require the metal deck to be fireproofed.

7.2 SOFFITS
7.2.1 First choice: Commercial quality steel or aluminum soffit panel.
7.2.2 Second choice: Exterior cement board with cementitious finish.
7.2.3 Do not use exterior gypsum products or wood.
7.2.4 Soffit finish must withstand a low pressure wash.
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7.3 BUILT-UP ROOFS
7.3.1 General
7.3.1.1 Roofs shall be four-ply built-up; or three-ply built-up with white modified bitumen cap sheet; or 60 mill single-ply PVC fully adhered system.
7.3.1.2 No interior rain leaders.
7.3.1.3 Consult latest edition of National Roofing Contractors Association (www.NRCA.net) roofing materials guide for low slope membrane and insulation board products for design, product, manufacturer and warranty information.
7.3.1.4 Review access to the roof with the Owner. There shall be no access to the roof that would allow students to access the roof. Do not place ladders on the outside of the building from the ground level. Ladders shall be provided from one roof level to another.
7.3.1.5 Number of roof penetrations should be minimized. Locate penetrations in a vertical outside wall whenever possible.
7.3.1.6 Locate outside air intakes away from exhaust fans.
7.3.1.7 All roofing materials and components comprising the total roof system shall be compatible with each other.
7.3.1.8 Roof areas must be sloped sufficiently to produce good and complete drainage to the outlets. Roof slope shall be attained by sloping structure/deck, not insulation.
7.3.1.9 A single subcontractor shall be responsible for the entire roof system.
7.3.1.10 All roof areas to be inspected by Owner’s Roofing Specialist for defects prior to installation of cap sheet.
7.3.1.11 When provided, sloped roofs and canopies to have a maximum slope of 6:12.
7.3.2 Substrate
7.3.2.1 The structural substrate shall provide a minimum slope of ¼ inch per foot.
7.3.3 Insulation
7.3.3.1 The roof insulation shall comply with the North Carolina Energy Conservation Manual.
7.3.3.2 Tapered insulation shall be minimized.
7.3.4 Membrane
7.3.4.1 Currently preferred systems include but are not necessarily limited to, the followings systems:
7.3.4.1.1 First choice is 4-ply with type VI fiberglass felts with modified cap sheet.
7.3.4.1.2 Second choice is fully adhered 60ml fleece backed PVC over a cover board.
7.3.5 Detailing
7.3.5.1 Consult National Roofing Contractors Association (NRCA) Manual (latest edition) for roofing design and detail recommendations.
7.3.5.2 Refer to SMACNA for sheet metal designs and details.
7.3.5.3 Detail flashing against parapets under copings, gravel stops, over shelf angles, windows, doors, horizontal relief joints, penetrations, and at changes from horizontal to vertical plane.
7.3.6 Project Conditions
7.3.6.1 For additions and renovation projects, provide alternate for fume recovery system if students and staff are on site.
7.3.7 Roof Walk-Pads
7.3.7.1 Show walk pads on architectural roof plan in configuration to meet roof manufacturer’s warranty requirements. As a minimum, provide from the point of roof access and to all equipment requiring service. Pads to be 10” – 12” apart.

7.4 METAL ROOFS
7.4.1 Manufacturer is required to inspect the installation prior to final acceptance.
7.4.2 Provide snow/ice guards. (T-Bar type that clamps to standing seams.)
7.4.3 Provide continuous 1 piece metal panels.
7.4.4 Avoid steep pitches and low slopes (3:12 min. slope). When provided, sloped roofs and canopies to have a maximum slope of 6:12.
7.4.5 Provide 2 piece clips in standing seams for thermal movement.
7.4.6 Provide standing seam, 2” minimum height, 2 ½” maximum height, and factory-made panels.
7.4.7 All flashing and roof accessories shall match roof material and color.
7.4.8 Metal roofs are acceptable for use on entrance canopies, athletic buildings, i.e., concessions, ticket booths, etc.

7.5 SEALANT/FIRE STOPPING
7.5.1 Require contractor to submit details on each proposed assembly identifying intended products and applicable UL system number or UL classified device.
7.5.2 Require contractor to verify with local building official when inspection of rated penetrations is required.
7.5.3 Specify manufacturers that are listed in the UL Fire Resistance Directory for the UL system used.
7.5.4 At painted drywall that terminates at brick, split-face block, or some other porous material that is not to be painted, provide a drywall edge and a thin bead of clear silicone caulk at that termination point and paint (cut) to that point.
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7.6 EXPANSION JOINT COVER
7.6.1 Provide metal expansion joint covers at all expansion joints as per SMACNA requirements.

7.7 GUTTER AND DOWNSPOUT
7.7.1 Provide over-sized units – exceed code minimums. Tie downsputs into storm drainage system; provide aluminum or cast iron (preferred) boots 18” high above grade.

7.8 SHINGLE ROOFS
7.8.1 Shingle roofs are acceptable for dugouts, storage buildings, etc.
7.8.2 Provide 20-year 3-tab asphalt shingles with underlayment and metal drip edge. Installation and ventilation systems per manufacturer’s warranty requirements.

7.9 BUILDING ENVELOPE AND AIR BARRIER REQUIREMENTS
7.9.1 The project shall be designed to conform to an air infiltration rate of no greater than 0.15 cfm per square foot of exterior envelope at 0.3 inches of water gauge (75 Pa) pressure difference when tested by a qualified testing agent.
7.9.2 Upon completion of the new buildings and/or additions CMS in coordination with the Designer and CM/GC will have an Air Barrier System Envelope Test performed to specifically measure the air leakage through the opaque and fenestration portions of the building envelope excluding HVAC related penetrations. Prior to initiating the test the following steps will be taken:
7.9.2.1 Windows and doors will be closed and latched with the exception of those that contain test fans, which will be secured in the open position.
7.9.2.2 All exhaust and make up air fans will be turned off, motorized dampers will be cycled to the closed position, and gravity dampers will be left in the closed position or blocked so they do not open from the pressures induced during the test.
7.9.2.3 All other HVAC related openings will be temporarily sealed.
7.9.3 Building designs resulting in actual air infiltration of less than or equal to .20 cfm when tested will be considered acceptable.
7.9.4 If after the CM/GC corrects the deficiencies and/or non-compliances the building does not conform to the acceptable leakage rate; at the discretion of the Owner; the Designer shall be responsible to correct the errors/omissions as required to bring the building into compliance including the cost of an additional retest.

8. OPENINGS

8.1 ENTRANCE SYSTEMS
8.1.1 Aluminum storefront systems with clear anodized finishes will be used at all prominent exterior entrances. Utilitarian spaces shall have hollow metal frames and doors.
8.1.2 Whenever possible, exterior doors should be recessed or have some means of overhead protection. Primary entrance doors must be covered. Secondary doors without overhead protection must have rain drips.
8.1.3 Recessed doors shall have a vision panel for security and monitoring.
8.1.4 Avoid use of automatic door operators.
8.1.5 CMS prefers to not have glass in the lower half of the doors.

8.2 EXTERIOR DOORS AND FRAMES
8.2.1 Aluminum storefront doors shall have wide stiles. The hardware supplier (not the door manufacturer) shall provide the hardware. Lite or narrow style doors are unacceptable; 5” nominal width, minimum.
8.2.2 Exterior doors should be designed to swing open 105 degrees minimum to reduce abuse to the door frame and hardware.
8.2.3 Exterior wood doors are not acceptable.
8.2.4 In existing openings mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
8.2.5 When there is panic hardware specified for an aluminum storefront door, coordinate the glazed opening with the panic hardware.
8.2.6 Provide stainless steel ball bearing hinges at exterior doors. Continuous hinges are unacceptable.
8.2.7 Exterior HM door from kitchen to loading area shall be 42” wide with a fly fan, peephole and doorbell.
8.2.8 In locations where multiple exterior doors are used, provide only one lock on the outside.

8.3 INTERIOR DOORS AND FRAMES
8.3.1 Generally, most interior doors shall be 3’-0” wide and 7’-0” high and solid core wood, 1 ⅝” thick.
8.3.2 Do not specify gypsum type fire doors; use hollow metal.
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8.3.3 Wood finish shall be birch or oak veneer, custom grade with a clear finish. Make sure that the tops and bottoms of the wood doors are sealed.

8.3.4 In renovation projects the new doors shall match the existing doors.

8.3.5 Flush wood doors shall be obtained through one source from a single manufacturer.

8.3.6 Avoid entrance doors to restrooms with multiple toilet compartments. Design entrances to toilet rooms with adequate screening that does not depend on doors.

8.3.7 Provide glass lites in all public access doors, or doors requiring visual access to spaces. Glass lites shall be ¼” clear, tempered glass.

8.3.8 Inside gyms, take care to locate doors away from the end of the courts where students can easily run into the lever set or glass. If doors must be located in these potentially hazardous situations, they will need recessed hardware and possibly pad protection.

8.3.9 Where double egress fire doors are required, the following conditions are preferred:

8.3.9.1 In a corridor area, design double egress single doors with an intermediate wall section and each door is held open with electromagnetic hold open devices.

8.3.9.2 Minimum 3’-6” opening.

8.3.9.3 Design (2) single doors with rim devices.

8.3.9.4 No center mullion.

8.3.9.5 No vertical concealed rod with top and bottom latches.

8.3.9.6 Vertical surface-mounted rod with top-only latch is acceptable under certain conditions – verify with CMS.

8.3.9.7 Verify that doors swing in the correct direction of exit travel per code.

8.3.9.8 At areas of double egress (near gym or multi-purpose), provide alarm device at exit doors for segregated use after school hours. These doors shall be equipped with battery type alarm device.

8.3.10 In general, interior doors that functionally are to be held-open most of the time but have closers, shall have magnetic hold-open devices. For example: doors in circulation paths through firewalls, doors to stairwells that are used for regular circulation, and any other that are likely to be held open with a wood wedge.

8.3.11 Inside Kitchens, specify HM door frames and HM doors with A60 galvanal coating.

8.3.12 Provide door identification tag on hinge side. See Appendix 8.3.12

8.3.13 At hinge stiles, provide manufacturer’s standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.

8.3.14 Provide fire-rated doors with fire-retardant stiles matching face veneer that are labeled and listed without the need for formed-steel edges and astragals.

8.3.15 At 20-minute, fire-rated, wood-core doors, provide wood beads and metal glazing clips approved for such use.

8.3.16 Door Size for all Band Rooms: Provide a minimum door width of 40”.

8.3.17 Classroom/Office/Workroom-type corridor doors:

8.3.17.1 Provide with glass vision panel. No sidelight windows.

8.3.17.2 Door width to accommodate floor buffer.

8.3.18 If used, double-acting, door-edge profiles shall have round vertical edges with 2-⅛” (54-mm) radius.

8.3.19 Kick and mop plates shall be used at utilitarian spaces and custodial doors.

8.4 STEEL DOORS AND FRAMES

8.4.1 Knock-down frames are not permitted.

8.4.2 Concealed fastenings shall be used.

8.4.3 At exterior locations, provide doors fabricated as thermal-insulating door and frame assemblies.

8.4.4 Countersunk flat or oval heads shall be used for exposed screws and bolts.

8.4.5 Frame stop/mullion shall be dimensioned to receive door closure for proper installation.

8.5 WINDOWS

8.5.1 Provide fixed windows unless required by code.

8.5.2 Do not provide windows so low as to interfere with lawn maintenance; breakage is an issue.

8.5.3 For operable windows required by code.

8.5.3.1 Do not provide operable windows that could project into a walkway path of travel.

8.5.3.2 Horizontal slider operable windows are preferred.

8.5.3.3 Do not provide double hung windows without approval.

8.5.3.4 For operable windows on upper levels, provide a window sill height and window opening restrictor that complies with exit code requirements as well as safety (OSHA) requirements - minimum 42”.

8.5.3.5 Specify institutional grade heavy-duty hardware that will withstand heavy use and abuse.

8.5.4 Glazing shall be clear insulated low-e glass, typically avoid low iron glass due to cost constraints. Recommend glazing in the low to medium range for solar gain.
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8.5.5 Architect must consider how windows will be maintained while designing the project, cleaning access to all interior and exterior glass surfaces.
8.5.6 Finish shall be clear anodized.
8.5.7 Separate aluminum and other corrovable surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
8.5.8 Utilize day-lighting when designing fenestration in all teaching spaces.
8.5.9 1” mini-blinds to match window framing system, use at exterior and interior windows.
8.5.10 Insect screens not required.

8.6 HARDWARE
8.6.1 Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
8.6.2 Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner’s final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations. Including a bitting schedule at conclusion of project to CMS locksmith department.
8.6.3 Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section Project Meetings. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system. A copy of the items CMS will bring up is available upon written request to the CMS locksmith Department.
8.6.4 All cylinders shall be factory master keyed and grand-master keyed as required by the Owner. All locks shall be constructed keyed during the construction period.
8.6.5 Construction control and operating keys shall not be part of the Owner’s permanent keying system or furnished on the same keyway as the Owners permanent keying system.
8.6.6 Locks will be supplied in manufacturers 6 pin standard key section with the exception of: the school is under an existing factory master key, cylinders will be supplied and keyed to the existing system.
8.6.7 Dry food storage at Kitchen Cafeteria shall be single, keyed different.
8.6.8 Provide CMS preferred padlocks at all gates, fencing, roof hatches or other access ways requiring security.
8.6.9 Provide panic hardware devices on play area gates for emergency egress away from the play area.

8.7 WINDOW SECURITY SCREENS
8.7.1 For windows required by code for classroom egress, if wire security mesh covers are provided, one per classroom must have mesh hinged with a sign on the interior of the mesh stating “Emergency Egress”. If the security mesh is attached to the operable window instead of attached to the frame, then there is no need to provide a sign.
8.7.2 Use security screens in exterior kitchen windows.

8.8 OVERHEAD COILING DOORS
8.8.1 Overhead door shall be motorized if larger than 6’ wide x 8’ tall.
8.8.2 Utilize standard manufacturer finish.
8.8.3 Overhead door at dishwasher location shall be stainless steel.
8.8.4 Obtain overhead coiling doors, operators and controls through one source from a single manufacturer.
8.8.5 Overhead coiling door curtain shall be fabricated of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Inside curtain slat face shall match the material of the outside metal curtain slat. If more than one overhead door, lock cylinders will be keyed alike.
8.8.6 Curtain jamb guides for counter doors shall be fabricated of material and finish to match curtain slats.
8.8.7 Exterior coiling door shall be provided with replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to the bottom and top of exterior doors.

8.9 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
8.9.1 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
8.9.2 Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
8.9.3 Flashing shall be manufacturer’s standard corrosion-resistant, non-staining, non-bleeding flashing compatible with adjacent materials. Exposed flashing shall be sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.
9. FINISHES

9.1 GYPSUM BOARD
9.1.1 Gypsum wallboard thickness shall be 5/8” minimum when used in single layer applications, in appropriate areas high-impact gypsum board shall be used.
9.1.2 Minimum stud spacing shall be 16” o.c. for 3-5/8”studs.
9.1.3 All classroom demising walls shall be constructed from slab to deck with continuous acoustic separation.
9.1.4 Provide blocking or metal strapping for attachments to gypsum wallboard partitions. Metal strapping should not be used for high-use applications.
9.1.5 Where gypsum board edges abuts porous material not to be painted, provide edge trim and caulk.
9.1.6 Middle, K8, and High School toilet ceilings use moisture-resistant gypsum board with epoxy finish. Access to all equipment is required.
9.1.7 Provide protective (FRP) board on non CMU walls behind utility type sinks, typically in custodial spaces, art and CTE classrooms.

9.2 CEILINGS
9.2.1 If the building configuration can accommodate a 10’ ceiling, that height is preferred over 9’ (minimum and in general type spaces and classes.)
9.2.2 Refer to Facility Programs for specific ceiling heights in the specialty spaces.
9.2.3 Acoustic Panel Ceilings
9.2.3.1 The standard suspended acoustical ceiling system shall be a 2x2 lay-in, square edge tile. Do not use a regular edge tile.
9.2.3.2 Concealed-spline ceiling tiles shall not be used.
9.2.3.3 Ceilings at Elementary School group toilets shall be flat lay-in vinyl faced panels with white aluminum grid.
9.2.3.4 Ceilings at individual staff toilets shall be flat lay-in vinyl faced panels with an aluminum grid.
9.2.3.5 Kitchen and serving area ceilings shall be flat lay-in tile. Finish should be vinyl covered meeting Health Department standards. Size to be 2’x2’. Grid to be aluminum finished white.
9.2.3.6 Corridors and main lobby shall use lay-in acoustical panels. Gypsum wallboard may be used as an accent. Consider exposed painted structure on a case by case basis.
9.2.3.7 Provide panels with a minimum NRC of .70 in classrooms.
9.2.3.8 Provide panels with a minimum NRC of .90 in music and band rooms.
9.2.3.9 Provide panels with a minimum NRC of .90 in cafeteria dining area and multipurpose rooms.
9.2.3.10 For any circular or non-linear penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

9.3 RESILIENT FLOOR AND BASE
9.3.1 Vinyl composition tile (VCT) shall be the predominant floor covering material in the school. Review a preliminary floor finish plan with the Owner prior to developing the construction documents.
9.3.2 Refer to the appendices for the ES and K8 Multipurpose Room play striping. See Appendix 9.3.2
9.3.3 Avoid use of rubber risers and treads on stairs, concrete filled pan stairs preferred.
9.3.4 Refer to Appendix 9.3.3 for HS gym striping.

9.4 CARPET
9.4.1 Carpet tiles (preferred) shall be used in the administration area, media center, remote office locations, SRO office, with the exception of Maker space.

9.5 TERRAZZO
9.5.1 High School lobby and corridors: Terrazzo floors with terrazzo base (include as an Alternate to the Base Bid).
9.5.2 Review a preliminary floor finish plan with the Owner prior to developing the construction documents.

9.6 CERAMIC TILE
9.6.1 Use ceramic tile that is impervious to soil and stains to reduce the amount of grout and to facilitate easy cleaning.
9.6.2 Toilets and Locker Rooms
9.6.2.1 Toilet and locker room floors shall be non-slip porcelain tile with epoxy grout. (White or light colored grouts are not to be used.) 1”x 1” or 2”x 2” mosaic tile will not be accepted.
9.6.2.2 Toilet and locker room walls: Ceramic tile with epoxy grout on CMU block is first choice. Epoxy painted CMU is second choice. Base to be tile.
9.6.2.3 Contractor to plug floor drain during construction to prevent grout from setting in P-trap.
9.6.2.4 Tile backing isolation membrane over cracks with concrete substrate and over areas susceptible to cracking.
9.6.2.5 Set tile on thickest mortar bed in all group restrooms (including elevated slabs) to provide proper slope to drains.
9.6.2.6 Use different colors of wall tile in male/female group restrooms for wayfinding.

9.6.2.7 Preferred: 5 foot high tile wainscot in group toilets on wet and end walls, and in Health room toilet room. Provide tile finish on wet walls and below and around the hand dryer to protect wall finish.

9.6.3 Kitchen

9.6.3.1 Use non-slip quarry tile on thickset mortar bed with epoxy grout as a flooring material in all kitchen areas.

9.6.3.2 Quarry tile floors shall have epoxy grout and positive slope to drains to insure water will not stand.

9.6.3.3 Walk-in cooler and freezer floor to be quarry tile with epoxy grout.

9.6.3.4 Walls and Base: Epoxy painted CMU meeting Health Department requirements.

9.6.3.5 Review a preliminary floor finish plan showing floor slope and floor drain locations with the Owner prior to developing the construction documents.

9.7 PAINTING

9.7.1 Standard field paint color to be CMS Oyster White (basis of color is ICI 1416).

9.7.1.1 Semi-gloss latex paint for gypsum board walls, CMU walls and hollow metal frames unless specified otherwise.

9.7.1.2 Preference for accent colors in higher locations. Door frame and HM door color to coordinate with rubber base color.

9.7.1.3 Custodial, toilet, kitchen areas and anywhere food will be served to receive semi-gloss epoxy paint over a higher grade of block fill.

9.7.2 Painting includes field painting of interior exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

9.7.3 Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts and labels. Prefinished items may include the following factory-finished components:

9.7.3.1 Architectural woodwork

9.7.3.2 Overhead coiling doors

9.7.3.3 Door hardware

9.7.3.4 Acoustical wall panels

9.7.3.5 Metal toilet enclosures

9.7.3.6 Metal lockers

9.7.3.7 Finished mechanical and electrical equipment

9.7.3.8 Light fixtures

9.7.4 Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

9.7.4.1 Furred areas

9.7.4.2 Ceiling plenums

9.7.4.3 Utility tunnels

9.7.4.4 Pipe spaces

9.7.4.5 Duct shafts

9.7.5 Finished metal surfaces may include the following:

9.7.5.1 Anodized aluminum

9.7.5.2 Galvanized metal

9.7.5.3 Stainless steel

9.7.6 Operating parts include moving parts of operating equipment and the following:

9.7.6.1 Valve and damper operators

9.7.6.2 Linkages

9.7.6.3 Sensing devices

9.7.6.4 Motor and fan shafts

9.7.7 Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in occupied spaces. Exposed mechanical items to be painted include, but are not limited to, the following:

9.7.7.1 Pipe hangers and supports

9.7.7.2 Heat exchangers

9.7.7.3 Tanks that do not have factory-applied final finishes

9.7.7.4 Ductwork

9.7.7.5 Insulation

9.7.7.6 Motors and mechanical equipment

9.7.7.6.1 Accessory items

9.7.7.7 Exposed electrical items to be painted include, but are not limited to, the following:

9.7.7.7.1 Conduit and fittings

9.7.7.7.2 Switchgear (Not already pre-finished)

9.7.7.7.3 Panelboards (Not already pre-finished)
9.8 WALL COVERING
9.8.1 Not allowed on CMS projects without written permission from CMS (on Letterhead).

9.9 WOOD FLOOR
9.9.1 Provide a wood gym floor in all MS, K8 and HS and not a sports or rubber floor. See Appendix 9.9.1
9.9.2 K8, Middle School and High School dance floors: Provide sprung wood floor system.
9.9.3 Provide wood floor on platform (stage) on a sleeper system that allows for replacement of damaged panels or areas.

10. SPECIALTIES

10.1 MARKER BOARDS
10.1.1 Locate in consideration of the teaching station, teacher’s desk, glare and view-ability for all students from all locations in the classroom.
10.1.2 See Appendices for standard teaching wall layout.

10.2 TACK BOARDS and STRIPS
10.2.1 Locate in consideration of the teaching station, teacher’s desk and view-ability for all students from all locations in the classroom.
10.2.2 Provide a minimum of one 4’ x 8’ tack board outside each elementary and K8 school classroom.
10.2.3 Provide a minimum of one 4’ x 4’ tack board outside each middle and high school classroom.
10.2.4 Provide tack strips outside of classrooms on corridor walls, confirm with CMS on extent.

10.3 FIRE EXTINGUISHERS/CABINETS
10.3.1 Do not use plastic bubble type door or breakable glazing.

10.4 TOILET PARTITIONS
10.4.1 Toilet and urinal partitions to be floor mounted, overhead-braced, solid plastic, or solid phenolic core.
10.4.2 Minimum 3’ wide stalls.
10.4.3 Provide a wall mounted bumper for the accessible stall door.
10.4.4 Preference for textured finish and color in the charcoal gray range. Panel thickness to be ¾” thick.

10.5 TOILET ACCESSORIES
10.5.1 Provide sanitary napkin disposal receptacles in all female group and staff toilet rooms in K8, Middle Schools and High Schools. Also provide in Elementary School women’s staff toilets and the women’s group toilet in public areas, such as adjacent to the assembly areas. Coordinate locations with CMS.
10.5.2 CMS standard toilet tissue dispensers to be installed at all locations and above grab bars in accessible stalls.
10.5.3 Electric hand dryers to be located in close proximity to the sinks to minimize water on the floor.

10.6 LOCKERS
10.6.1 At middle and high schools, limited student corridor lockers are to be provided under the general contract. Verify quantity with CMS.
10.6.2 When lockers are provided in High Schools and Middle Schools, provide combination pad locks for hall lockers and provide CMS with master key(s).
10.6.3 Locate ADA lockers at the end of a row, NOT all grouped together. Hooks and shelves inside this locker are to be at accessible heights plus an extra shelf at 16” above locker floor. When 2-tier lockers are used, the ADA locker will be the lower one.
10.6.4 CMS prefers that lockers are installed on only one side of the corridor whenever possible.
10.6.5 All lockers shall be vented.
10.6.6 Corridor and PE lockers shall be 12” x 12” single or double tier.
10.6.7 Kitchen lockers shall be 12” x 12” x 72”.
10.6.8 Athletic lockers shall be 18” x 18” x 72”.
10.6.9 Locks for the corridor lockers need to be provided as part of the construction contract: High security combination padlock with key for supervisory access.
10.6.10 Verify Accessibility Code and ADA requirements.

10.7 OPERABLE PARTITIONS
10.7.1 Partitions to be supported independently off the roof structure or joists of the floor above (do not use floor-supported partitions). Verify structural requirements to ensure that the mid-span deflection will not impede movement of the
operable partition or affect the performance of acoustic seals. Include the supporting miscellaneous steel required as part of the general construction contract.

10.7.2 Partitions to include mechanically operated top and bottom sound seals.
10.7.3 Single-lead partitions are less expensive and have many operational advantages.
10.7.4 CMS prefers NO pass doors.
10.7.5 Provide walls to house the partition in the open position.

10.8 INTERIOR SIGNAGE
10.8.1 Signs to comply with NCSBC accessibility and ADA requirements. See Appendix 10.8.1
10.8.2 Screw-attach to wall with tamper-proof screws. Use adhesive tape only over glass.
10.8.3 Verify sign titles with Owner prior to shop drawing approval.
10.8.4 Dedication Plaque location to be confirmed with CMS (new or replacement schools only). See Appendix 10.8.4
10.8.5 Provide fire evacuation signage in all occupied spaces, roof access signage, kiln inside signage (at the art room and in corridor), 4” wayfinding letters above the fire doors in the corridors, sprinkler access above signage (in the kitchen above the cooler/freezer), fire alarm control panel signage (outside of the space where it is located).

10.9 TELESCOPING BLEACHERS
10.9.1 Bleachers for gymnasiums shall be included in the general construction contract.
10.9.2 Architect to indicate layout of bleacher seating on plan and provide appropriate accommodations for wheelchairs per ADA requirements. Bleacher seating and accessible routes must not encroach onto the playing surface when fully open.
10.9.3 Telescoping bleachers must be attached to the wall and be electrically operated.
10.9.4 Provide safety end closure panels at all telescoping bleachers.
10.9.5 Bleachers to have integrated plastic seats in school colors in existing schools or new schools where school colors are established.
10.9.6 Provide seating for approximately 400-500 people at middle schools and K8s. Provide seating for approximately 1500-1600 at high schools.

10.10 EXTERIOR SIGNAGE
10.10.1 The entry sign shall not obstruct the view of a motorist. Coordinate with CMS for landscaping in the area of the sign.
10.10.2 School Marquee - All facility marquees shall be LED, programmable information type and shall be provided at a location near road, as coordinated with Owner.
10.10.3 Directional signs are to be located at intersections or key points throughout the campus. The signs shall contain arrows to direct traffic to individual buildings and designated parking lots.
10.10.4 Traffic signs shall be the standard signs used by the local government or the North Carolina DOT, traffic signs shall have reflective graphics.
10.10.5 Provide school name with metal letters on building façade. Coordinate name and location with CMS.
10.10.6 Provide a fire department designation sign for new construction projects on multi building campuses.
10.10.7 CM/GC to provide a construction sign for the project, see appendices for details.

11. EQUIPMENT

11.1 FOOD SERVICE EQUIPMENT
11.1.1 ES Kitchen Equipment See Appendix 11.1
11.1.2 K8 Kitchen Equipment See Appendix 11.2
11.1.3 MS Kitchen Equipment See Appendix 11.3
11.1.4 HS Kitchen Equipment See Appendix 11.4

11.2 PE EQUIPMENT
11.2.1 Designer to allow for owner provided and installed (vendor) climbing wall in Elementary and K8 schools’ multi-purpose rooms, coordinate with CMS.
11.2.2 Designer to coordinate with CMS on locations and attachment of owner provided and contractor installed TRX system for all MS and K8 facility types only. Provide 14 snap on training stations at 5'-6" OC and at 6” and 96” AFF. Provide 10 snap on training stations at 5'-6" OC at 96” AFF, on a separate (perpendicular) wall.

12. FURNISHINGS

12.1 SOLID WOOD MEDIA CENTER CASEWORK
12.1.1 Capacity - Refer to CMS Media Services book collection worksheet.
12.1.1 Generally a new 45 classroom elementary school, 54/63/66 classroom, K8 or 54 classroom middle school utilize perimeter shelving with mobile shelving to house a maximum 10,000 volumes. Refer to CMS Media Services book collection worksheet. For Language Immersion schools or other magnet/specialty programs consult CMS Media Services regarding quantities of collection.

12.1.2 Generally a new 125 classroom high school utilize perimeter shelving with mobile shelving to house a maximum 10,000 volumes.

12.1.2.1 Perimeter Shelving

12.1.2.1.1 Elementary School/K8: 5’ high x 12” deep with 3 adjustable shelves (divider type).

12.1.2.1.2 Middle School: 6’ high x 12” deep with 4 adjustable shelves

12.1.2.1.3 High School: 7’ high x 12” deep with 5 adjustable shelves

12.1.2.2 Top of shelving unit shall have a valance and bottom should have a toe plate/kick.

12.1.3 Double-faced mobile divider wood shelving:

12.1.3.1 Elementary School/K8: Centrally located shelving shall be 3’ high x 24” deep (double sided) with one adjustable shelf on each side (divider type). Provide 3-foot long sections to supplement perimeter shelving to meet book collection requirements.

12.1.3.2 Middle and High School: Centrally located shelving shall be 3’-9” high x 24” deep (double sided) with one adjustable shelf on each side, with no dividers. Provide 3-foot long sections to supplement perimeter shelving to meet book collection requirements.

12.1.3.3 Each section must be capable of carrying 1,000 pounds.

12.1.4 Media Center - All Shelving

12.1.4.1 12” minimum clear spacing between all shelves.

12.1.4.2 All units to be solid oak. No particleboard allowed.

12.1.4.3 All units shall have a 1/4” plywood back panel of plain sliced oak veneer.

12.1.4.4 Adjustable shelves to be set at ½” increments.

12.1.4.5 All shelving units to utilize individual sectional tops to allow maximum flexibility in reorganizing shelving ranges. Continuous tops are not acceptable.

12.1.4.6 All shelving units are to be assembled using a minimum of four (4), 5/16” hex bolts with washers and nuts per section face to provide maximum strength, stability and easy disassembly and re-assembly. The use of screws into the wood panel stock is not an acceptable method of assembly.

12.1.4.7 Divider shelves are required at elementary school main rooms only. Shelves shall be solid oak with a 2 ½” high back and three 3/4” solid oak dividers that are glued and screwed in place. Dividers are to be 6” high and equally spaced along shelf width.

12.1.4.8 Shelf pins are to be double-pin, anti-tipping shelf locks capable of supporting 300 pounds.

12.1.5 Media Center Magazine Shelving

12.1.5.1 Built-in units with sloped solid oak shelves.

12.1.5.2 Sloped shelves are 14” high with a solid oak lip and able to be located in any standard 12” deep unit regardless of height or location in room. This makes a special depth magazine unit unnecessary and provides maximum layout flexibility.

12.1.5.3 Sloped top shelf is also the top of the magazine shelving unit. There is no countertop.

12.1.5.4 Elementary school/K8: Provide three 5’ high x 3’ wide perimeter sections of magazine shelving.

12.1.5.5 Middle School: Provide five 6’ high x 3’ wide perimeter sections of magazine shelving.

12.1.5.6 High School: Provide five 7’ high x 3’ wide perimeter sections of magazine shelving.

12.1.6 Casters: 2” diameter casters shall be provided in the island shelving units and concealed within the base of the shelving unit. Caster supports to be designed so that the shelving range height is not increased more than 5/8” and will support minimum 250 pounds each. Provide (4) casters for each 3-foot long shelf section. Color to be black.

12.1.7 Book Drop: Coordinate height of the book drop cart with the modular circulation desk slot.

12.2 LAMINATE CLAD CASEWORK

12.2.1 Refer to the appendices for casework elevations and details.

12.2.2 Casework in all Middle, K8 and High School areas (except Science Classrooms) shall be plastic laminate covered MDF with solid 3mm thick PVC edging or solid wood chamfered banding and with heavy-duty five knuckle hinges.

12.3 DISPLAY CASEWORK

12.3.1 Provide built in display casework at all schools. Quantity and location to be determined by CMS staff.

12.4 SCIENCE CASEWORK

12.4.1 Science casework (manufactured) shall be hardwood (with a preference for red oak) cabinets and drawers with acid proof tops with integral sink bowls and sink filler panels.

12.4.2 Science lab sinks and casework to be around the perimeter of the classroom in Middle Schools, K8, and general science classrooms at high schools. Provide protruding peninsulas in High School Biology and Chemistry.
ARCHITECTURAL

12.5 CAFETERIA SEATING (Not in Contract)
12.5.1 Cafeteria seating to utilize folding, 12 seat table configuration.

12.6 HORIZONTAL BLINDS
12.6.1 Generally all exterior windows shall receive blinds (which should match window framing system) where practical for light control and/or security.
12.6.2 No blinds on doors.

13. SPECIAL CONSTRUCTION

13.1 BLEACHERS
13.1.1 High school football stadiums - Provide permanent aluminum bleachers for 2,500 home and 1,500 away spectators. Provide accessible route and companion seating per ADA requirements. Provide covered scoring platform on press box roof accessed only through the press box. Provide scoring covered platform on visitor side.
13.1.2 High School baseball - Provide an accessible route, slab and aluminum bleacher seating for 250 spectators.
13.1.3 High School softball - Provide an accessible route, slab and aluminum bleacher seating for 200 spectators.
13.1.4 Middle School football fields - Provide an accessible route and slab.
13.1.5 K8 soccer fields - Provide an accessible route and slab.

14. CONVEYING EQUIPMENT

14.1 Elevator shall have a side entry single acting door (no center bi-parting doors) and adequate platform space to allow EMS use with an ambulance stretcher and multiple wheelchairs.
14.2 Hydraulic lines (if used) shall be accessible, not buried underground.
14.3 A grate shall be provided over the sump pit.
14.4 Elevators shall be programmed to automatically go to the first floor in the event of a power outage. The Designer shall resolve code requirements and provide an area of refuge.
14.5 Request that the elevator floor finish be provided by the general contractor and it should be the same finish as the corridor.
14.6 Keying features shall not affect emergency firefighters’ service.

22. FLOOR DRAINS

22.1 Provide in rooms with washer and dryers.
22.2 Provide in all kitchens, group toilets, mechanical rooms and modified restrooms. Locate so that the drain is aligned under the most central partition but not under a partition floor support.
22.3 Science classrooms with emergency shower.

26. FIRE ALARM DESIGN AND DEVICES

26.1 CMS preference for fire alarm pull stations in lieu of smoke detectors.
INTRODUCTION
Division 21 is the fire protection portion of this Standard. It is intended to assist a qualified Plumbing Engineer in the preparation of drawings and specifications for the fire protection system to be included in school construction. It is not intended to serve as a code book or a construction specification. It also does not relieve the Plumbing Engineer of his responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 21 is compiled primarily to describe the fire protection system for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of the fire protection renovation. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

21. FIRE PROTECTION
21.1 Underground water service; 2 ½ in. and less – type “K” copper with silver solder joints; 3 in. and above; cement lined ductile iron ASTM C151 with mechanical joints except straight sections may be push-on joints.
21.2 Backflow Preventer for fire line service, use double check type.
21.3 Backflow preventer for fire loop shall be located in an insulated cover. See 5.07.
21.4 Appropriate local authorities shall approve fire hydrants and valves.
21.5 Provide profile of water distribution lines to site from nearest source of municipal water with all interferences.
21.6 Provide hydrant protection with pilings.
21.7 Fire loop around building shall be sized appropriately with fire hydrants spaced per authority having jurisdiction.
21.8 Fire Protection: The Mechanical Engineer is responsible for obtaining flow test data on the fire main and building protection requirements to make a preliminary assessment of the need for a booster pump for the fire line before construction documents are issued for review.
21.9 Provide concrete bunker around control valve boxes, meters, etc.
21.10 Ductile iron class 50 with push on type joints – ASTM C-150 (for 8 inch and larger).
PLUMBING

INTRODUCTION
Division 22 is the plumbing portion of this Standard. It is intended to assist a qualified Plumbing Engineer in the preparation of drawings and specifications for the plumbing system to be included in school construction. It is not intended to serve as a code book or a construction specification. It also does not relieve the Plumbing Engineer of his responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 22 is compiled primarily to describe the plumbing system for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of plumbing renovation. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

22.1 GENERAL

22.1.1 All provisions to the “General Plumbing & HVAC Requirements” in above shall apply to this section.
22.1.2 All water consuming devices shall be of the water saving type.
22.1.3 Provide positive freeze protection on all water lines fixtures subject to freezing conditions.
22.1.4 Provide outside freeze proof hose bibs at 100 feet intervals around the building.
22.1.5 Provide a ball valve in branch piping to all exterior hose bibbs. Where suitable locate hose bibbs adjacent to exterior mechanical rooms, dropping branch piping exposed in mechanical room and locating ball valve a maximum of 6’ above finish floor. Provide 18” clearance under all hose bibbs.
22.1.6 Contractor shall be required to completely rod and flush out all sanitary waste lines both new and existing after a building is completed. A diagnostic video of all sanitary waste lines will be performed. One video will be done after the slab is poured and another at the completion of the project. The design engineer and CMS engineer should be informed prior to making this video.
22.1.7 Provide isolation valves in cold water and hot water piping so that water can be shut off to each classroom wing, administration area, each individual group toilet (separate shut-off for boys and girls) and science classrooms.
22.1.8 Provide chrome escutcheon rings at all exposed ceiling and wall penetrations.
22.1.9 Engineer shall specify plaster solids interceptor for all art room sinks.
22.1.10 Provide all floor drains with SureSeal, deep seal P-trap.
22.1.11 Install all V.T.R. (vent through roof) a minimum of 15 ft. from fresh air intake.

22.2 PLUMBING VALVES

22.2.1 Gate valves are not allowed.

22.3 PLUMBING FIXTURES

22.3.1 Provide floor mounted type water closet, vitreous china.
22.3.2 Elongated bowls on water closets and open front seats, without covers, with stainless steel or solid brass closet, bolts and nuts and black seats.
22.3.3 Utilize acid-resistant, cast-iron (no ceramic) lavatories with through wall carriers.
22.3.4 Grid type strainers are specified in lavatory drains in public toilets and restrooms.
22.3.5 Provide tamper proof aerators and faucets.
22.3.6 Only single purpose fixtures shall be specified.
22.3.7 Waste fittings to be cast iron type with 17 gauge traps.
22.3.8 Provide wall hung type urinals with removable strainers.
22.3.9 Provide water coolers with a bottle filler.
22.3.10 Provide a mop sink within the kitchen.
22.3.11 Provide key operated, chrome plated, box type, hose bibb mounted flush with wall for group toilets.
22.3.12 All water closets and urinals shall have automatic flush valves.
PLUMBING

22.4  WATER SUPPLY

22.4.1  Main domestic water supply line shall have a pulse meter located in, or close to the boiler room interconnected to Energy Management System, and a reduced pressure backflow preventer installed downstream of the CMUD meter on the school property.

22.4.2  Provide shock absorbers on supplies to all fixtures/appliances that have quick closing valves.

22.5  HOT WATER

22.5.1  New School
22.5.1.1  Maintain 85-110 deg F hot water to lavatories. Discuss with CMS Engineers.
22.5.1.2  Maintain 140 deg F hot water to kitchen prep sinks and dishwasher. Dishwasher will have a booster heater for final rinse temperature of 180 deg F minimum.
22.5.1.3  Install gas fired tankless water heaters to provide domestic hot water.
22.5.1.4  Provide one set of tankless heaters to serve only the 140 deg F kitchen hot water loop and separate set of tankless heaters to serve the 110 deg F building loop.
22.5.1.5  Provide an installed spare tankless water heater for each system to allow for uninterrupted maintenance.
22.5.1.6  Preference is to not use mixing valves. Preference is to circulate building hot water loop at 110 deg F with a separate 140 degree loop for the kitchen area. Where applicable provide mixing valves to reduce the temperature of the hot water to 110 ° F. Do not use heat tape as a means of maintaining water temperature on hot water lines.
22.5.1.7  In renovation projects, discuss hot water requirements with CMS.
22.5.1.8  In renovation projects, consider the location of programs/functions requiring warm water temperature of 110° including, but not limited to children’s lavatories within proximity of Cafeteria, modified restrooms, Health Room, accessible shower/Health Room, Pre-K, After-School Enrichment Program (ASEP), staff-use lavatories, and as required by code and/or the Health Department.
22.5.1.9  Any shower in the school, including the accessible bathrooms and health room shall have an anti-scald mixing valve.
22.5.1.10  Safety showers will be tempered to 85 degrees F or as required by code.
22.5.1.11  Provide a hot water system in a loop configuration.
22.5.1.12  If hot water is required at locations that require very long runs of piping and/or circulation pumps, special consideration should be given to an alternate source. An electric instantaneous hot water system sized to meet the demand is an economical source for continuous hot water. An energy efficient water heater would be the last consideration due to size and cost of operation over the years.
22.5.1.13  If tempering valves are used, locate these at point of use.
22.5.1.14  NSF approval required for 180-degree F water-heaters.
22.5.1.15  Circulators for domestic hot water shall be bronze.
22.5.1.16  Provide shock absorbers in supply line between hot water heater and dishwasher machine.
22.5.1.17  Install tees, valves and male pipe nipple with cap on the hot and cold water lines close to the water heater for emergency purposes.

22.6  COLD WATER

22.6.1  Provide appropriate protective boxes for shut-off valves, etc. on CMS property.

22.7  DOMESTIC WATER PIPING

22.7.1  Provide hot and cold water to all lavatories.
22.7.2  Underground piping
22.7.2.1  Domestic water piping shall not be below slab-on-grade construction, except at riser room. Provide Type “K” copper with silver brazed joints for domestic water piping underground at riser room.
22.7.2.2  PVC piping can be used starting five feet outside of the building.
22.7.3  Above ground piping
22.7.3.1  Type “L” copper with lead free soldered joints (95/5 solder).
22.7.4  Backflow Preventer Applications:
22.7.4.1  Domestic water service, use reduced pressure type backflow preventer.
PLUMBING

22.7.4.2 Fire Line service, use double check type backflow preventer.
22.7.4.3 Irrigation service, use double check type backflow preventer.
22.7.4.4 Provide pressure gauges on entering and leaving sides of backflow preventer assembly.
22.7.4.5 Applications for all backflow prevention assembly installations must be submitted to and approved by Charlotte Water.
22.7.4.6 Provide heated, insulated enclosure (hot box) for backflow prevention assemblies installed outside and above ground. Coordinate with electrical design engineer for adequate power supply.
22.7.4.7 All underground non-metallic pipes must be marked and identified with tracer wire tape.
22.7.4.8 Pressure reducing valves shall be installed in domestic water service and irrigation service when the water pressure exceeds 65 psi.

22.8 IRRIGATION SYSTEMS

22.8.1 Provide irrigation system for athletic fields at Middle Schools, K8s and High Schools. Discuss each project with CMS Engineers.
22.8.2 Install backflow preventer for irrigation service, use double check type.
22.8.3 Install metal identification tapes (or 14 gauge or larger tracer wire) over PVC lines.
22.8.4 Minimum 24” cover to top of irrigation piping.
22.8.5 Meter the irrigation water supply so the amount of water can be subtracted from main meter to save sewage charges.
22.8.6 Use triple elbow swing joints at all heads.
22.8.7 Provide head protection from aeration.
22.8.8 Configure underground solenoids to minimize distance of underground wiring from head-end. Drive at least one ground rod at head-end.
22.8.9 Provide concrete bunker around control valve boxes, meters, etc.

22.9 PLUMBING SUPPORTS AND ANCHORS

22.9.1 One hanger manufacturer used throughout the job is preferable.
22.9.2 Horizontal piping hangers – insulated piping shall have hanger around insulation with rigid insulation above shield. Adjustable steel clevis hangers are recommended.
22.9.3 Vertical piping clamps – size to fit bare pipe, copper plated for copper piping.
22.9.4 Building attachments – use beam clamp with retaining strap or concrete inserts.
22.9.5 Use trapeze hangers where possible to rack piping together.
22.9.6 Do not support piping from bar joist bridging and/or roof deck.
22.9.7 Support all piping so as to prevent excessive movement.

22.10 NA

22.11 NA

22.12 SEWAGE DISPOSAL

22.12.1 Public Sanitary Sewer Lines
22.12.2 All plumbing 5’ beyond all buildings on property shall be installed under DIVISION 2.
22.12.3 Manholes shall be spaced no more than 300’ apart.
22.12.4 Provide manhole to make tie-in to 6” and larger sewer.
22.12.5 Use 4’ diameter pre-cast eccentric manholes with steps 15” on center.
22.12.6 Minimum cover in non-traffic areas will be 3’.
22.12.7 Minimum cover in traffic area shall be 3’ for ductile iron on Class 1 bedding.
22.12.8 See Section 5.02 for sewer material.
22.12.9 Provide profiles of sanitary sewer lines between manholes.
22.12.10 Use laser instrument to install all exterior sanitary sewer lines.
22.12.11 Use drop manhole if elevation of sewer line exceeds 24” above manhole invert.
22.12.12 Minimum slope of sewer lines:
22.12.12.1 Minimum of ¼” per foot slope inside and under the building until the first manhole connection.
PLUMBING

22.12.12.2 Minimum flow velocity – 2fps
22.12.12.3 Sewer lines shall be located outside of building. Design sanitary sewer lines to exit the building as soon as possible.
22.12.12.4 Sewer lines shall be straight with uniform slope between manholes.
22.12.12.5 Maximum slope is 10%.
22.12.12.6 Show new and existing grade contours on plan.
22.12.12.7 Exterior area cleanouts shall have pre-cast concrete donuts installed to protect cleanouts, valve boxes, meters, shut-off valves, etc. Donuts are to be no higher than 2” above grade.
22.12.12.8 Install stub-outs for future mobile classrooms per CMS Engineers. Mechanical and Civil engineer coordinate.
22.12.12.9 Engineer shall require contractor to dimension actual location of all sewer lines on as-constructed drawings. A minimum of two (2) dimensions from building reference points shall be provided and a bury depth indicated at a minimum spacing of 100’.
22.12.12.10 Provide a minimum of a 6” sewer waste line from all group toilet restrooms.
22.12.12.11 If applicable, sewage ejectors and lift stations shall be installed with a cellular (preferred) phone line for the alarm package. These systems are not preferred.

22.13 KITCHEN PLUMBING

22.13.1 Maintain 140 deg. F. water to dishwasher, prep and pot sinks, can wash, and mop receptor.
22.13.2 Maintain 110 deg. F. water to hand sink. Discuss alternate designs with CMS Engineers.
22.13.4 Provide hand sinks with sensor type operation.
22.13.5 Provide stainless steel or enameled cast iron floor sink for indirect waste from prep and pot sinks and steamer.
22.13.6 Provide 7” round recessed strainer floor drain for indirect waste from ice machine, serving line equipment and cooler/freezer.
22.13.7 Provide stainless steel floor troughs for wastes from cutter mixer, tilting skillet and area in front of steamer and steam kettle. Use stainless steel strainers built-in as a component of trough. PLEASE NOTE: Drain for tilting skillet installed parallel to skillet, not perpendicular to the skillet. Place ½ of floor drains (each floor drain) in front of equipment for cleanout purposes.
22.13.8 Provide cleaning faucet – American Standard or similar and mount under hand sink. 18” above finish floor.
22.13.9 Provide floor drain under cleaning faucet.
22.13.10 Provide an adequate number of general area floor drains to kitchen so entire floor can be easily hosed down (drains shall be sloped at ½” below finished floor, and floor shall be sloped to drains)
22.13.11 Provide hose reels for cleaning purposes, one reel close to the rear door entrance and another reel in the dishwasher area.
22.13.12 Provide a utility distribution system to serve equipment under hood. Use flexible hoses under hood. Adjust hose lengths to prevent hoses from lying on floor.
22.13.13 Kitchen equipment shall utilize natural gas where available. Do not use LP gas.
22.13.14 Hood manufacturer shall furnish solenoid gas shut off valve to Plumbing Contractor for installation.
22.13.15 Provide American Standard freeze proof mixing faucet with a vacuum breaker for can wash. Provide shut-off valves in a protected location on hot and cold water supply lines to faucet.
22.13.16 Provide non-clog floor drain for can wash.
22.13.17 Provide manual hose reel in dishwashing area for wash down.
22.13.18 Provide minimum 1,000-gallon capacity outdoor grease interceptor (use Charlotte Water outdoor sizing requirements). Provide minimum 500 gallon capacity outdoor solids interceptor.
22.13.19 Connect disposals to solids interceptor prior to the grease interceptor.
22.13.20 Provide fill faucet for cutter mixer.
22.13.21 Use copper pipe for prep and pot sink for continuous waste.
22.13.22 Provide shock absorbers for all solenoid operated equipment.
22.13.23 Provide water filter at kitchen icemaker connection.
22.13.24 Provide hot and cold water supply for steamer.
22.13.25 Plumbing Contractor shall do all final connections to kitchen equipment except items connected to the utility distribution system.
22.13.26 All floor drains shall be accessible.
22.13.27 Check all kitchen equipment to be sure we pick up all faucets.
22.14 **DRAINAGE, WASTE AND VENT SYSTEMS**

22.14.1 This section includes sanitary, acid and storm drainage and vent piping systems inside building to a point 5 feet outside building. Roof drains are to be furnished and installed by General Contractor. Plumbing Contractor connects to roof drain outlet.

22.14.2 All cast iron piping and fittings shall meet the latest standards and specifications of the Cast Iron Soil Pipe Institute (CISPI) and of the American Society for Testing and Materials (ASTM).

22.14.3 Sanitary lines and drainage under slab shall be videotaped twice by a third party:

22.14.3.1 Following the pouring of the slab.

22.14.3.2 When all underground sanitation and the pouring of the slab is complete. Third party to issue report of test identifying any deficiencies, and marking on drawings where applicable. Videoing to be performed in the presence of CMS Plumbing department representative.

22.15 **FLOOR DRAINS**

22.15.1 Provide floor drains in all toilet rooms with more than one water closet and in the staff restroom in the kitchen area.

22.15.2 Provide floor drains at all water heater locations.

22.15.3 Provide all floor drains with SureSeal, deep seal P-trap.

22.15.4 Minimum drain size shall be 3”.

22.15.5 Floor drains shall be located in all boiler rooms and in all mechanical equipment rooms (including laundry rooms) containing any equipment utilizing steam or water or that produces condensation. Drain shall be located ½” below finished floor. Slope floor toward drain.

22.15.6 At toilets, locate floor drains away from high traffic areas, and not under toilet partitions.

22.15.7 Kitchen can wash areas: Provide floor drain and non-freeze faucet with permanent vacuum breaker.

22.16 **H CLEANOUTS**

22.16.1 H.1 Do not design clean outs in a space with carpet or wood flooring.

22.16.2 H.2 Floor cleanouts:

22.16.2.1 Exposed rim type, install flush with floor finish.

22.16.2.2 Exposed flush type, standard non-slip scored or abrasive finish.

22.16.2.3 Design clean outs to be flush with floor finish material.

22.16.3 H.3 Wall cleanouts:

22.16.3.1 Utilize cast iron body with cast-bronze clean-out plug, stainless steel cover.

22.16.3.2 H.4 Exterior cleanouts at finish grade: Cast brass plug with recessed slot in fitting or in caulked cast iron ferrule. Exterior area cleanouts shall have pre-cast concrete donuts installed to protect cleanouts, valve boxes, meters, shut-off valves, etc. Donuts are to be no higher than 2” above grade.

22.16.3.3 I - Pipe sleeves – schedule 40 black steel.

22.17 **ACID WASTE LINES**

22.17.1 Acid resisting waste lines are required for all science labs in High Schools and Middle schools, per DPI requirements.

22.17.2 Route acid waste piping from science classrooms to acid neutralization tank before tie in to sanitary sewer. Preference for one large tank outside of the building in lieu of point of use system(s).

22.17.3 Provide access to sensor probes in acid waste discharge line.

22.17.4 Alarm panel for neutralization tank should be mounted inside science lab/classroom.

22.17.5 High water alarm and flasher mounted outside building.

22.17.6 Corrosion resistant traps required in all fixtures in chemistry classrooms.

22.17.7 P-traps to wall are preferred in lieu of S-traps to floor.

22.17.8 Plaster and/or interceptor traps are required for work sinks in areas such as art classrooms, and shall be accessible for cleaning.

22.17.9 Underground and above ground acid waste and vent piping shall conform to the following:

22.17.9.1 Acid resistant Polypropylene pipe, schedule 40, flame retardant with socket fittings.

22.17.9.2 Electrical fusion or heat fusion joints.
PLUMBING

22.17.9.3 No hub under slabs.

22.18 VENTS and VENT PIPING

22.18.1 Two-piece vent-pipe flashing at the roof is preferred, of which one should be a cap over pipe overlapping the base flashing. Use copper or lead.
22.18.2 Use 3” minimum vent size at point of roof penetration.

22.19 ROOF DRAINS – Move

22.19.1 Designed in accordance with the North Carolina State Building Code - Plumbing. CMS prefers to utilize gutters and downspouts.
22.19.2 Roof drain installation to be by the general contractor/roofing contractor. Flashing to be done by general contractor/roofing contractor.
22.19.3 Piping to roof drains by plumbing contractor.
22.19.4 See Thermal and Moisture Protection in “General Design Guidelines” for boots.

22.20 FITTINGS

22.20.1 Provide all lavatories with individual water supply cutoff valves. Provide separate supply cut off valves to each bank of urinals and water closets in the group toilets.
22.20.2 All exterior hose bibbs to be freeze-proof type and key operated.
22.20.3 Lavatory waste fittings to be cast-type not tube construction.
22.20.4 All group toilet rooms have isolation valves that are clearly located and marked and accessible.
22.20.5 Provide and install isolation valves at for each group toilet, wing/area, gym/locker rooms and kitchen that will facilitate easy access, maintenance, and repair of fixtures and equipment of total plumbing and mechanical systems.

22.21 NATURAL GAS SYSTEMS

22.21.1 Engineer and Contractor shall coordinate with Gas Company and have high-pressure gas line routed to gas meter. Plumbing contractor shall connect to load side of meter and extend inside building. Gas meter shall have pulse attachment for EMS interface.
22.21.2 Provide main gas valve above ground prior to entrance to building.
22.21.3 Provide adequate air for combustion and proper ventilation when locating gas-fired water heaters.
22.21.4 Preference to route gas piping outside of the building, however gas piping may be installed above accessible (lay-in) ceiling if outside the building preference is not feasible. Do not locate gas piping under floor slab and inside solid partitions including CMU. Provide accessible chases for concealed gas piping, for example a floor trench. Route gas piping exposed where possible. Gas line not allowed in return air plenum.
22.21.5 Provide gas shut off valves at each piece of equipment.
22.21.6 Final connections to equipment shall be made with flexible connectors.

22.22 COMMISSIONING

22.22.1 CMS has incorporated a Commissioning Program for all of its Capital Improvement Program schools. CMS shall hire an independent Commissioning Agent, however this shall not relieve the contractor or the engineer from their prime responsibilities. The Architect shall incorporate into each project specifications defining the commissioning plan provided by the Commissioning Agent. It will be the responsibility of the Plumbing contractor to provide all required labor and/or material to comply with the commissioning plan.
INTRODUCTION
Division 23 represents the mechanical portions of this Standard. It is intended to assist a qualified Mechanical Engineer in their preparation of drawings and specifications of the complete system. This information is not intended to serve as a code book or a construction specification. It also does not relieve the Mechanical Engineer of their responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 23 is compiled primarily to describe the mechanical system for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of the mechanical system renovations. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

23.1 GENERAL

23.1.1 Design conditions will follow North Carolina Mechanical and Plumbing and Energy Codes for Charlotte, NC.
23.1.2 New schools, additions, and renovations to existing facilities shall be air-conditioned and all areas shall have the means for CO2 and dehumidification control. The heating and air conditioning systems, i.e., type of system must be discussed with the Charlotte-Mecklenburg Schools (CMS) representative(s) before the design work begins.
23.1.3 In accordance with Chapter 4, Section 403.3 of the NC State Mechanical Code, 2012 Edition, outside air intake components shall be sized per Table 403.3, but school classroom’s ventilation may be reduced to a minimum of 7.5 CFM per person as noted.
23.1.4 Additional ventilation and/or exhaust systems shall be provided as required for conditions that generate unusual odors or sensory irritating contaminants. Test and Balance for outside air shall be for 7.5 CFM per person. Once the determination of the system has been agreed upon, load calculations, including existing buildings when adding to these buildings, shall be submitted to CMS Design Team for review and comments prior to the final selection of equipment.
23.1.5 It shall be the responsibility of the designer or engineer to determine in consultation with CMS the type of HVAC system to be designed, and installed, taking into consideration the conditions and the location of the project. The total building cooling load shall cater for the diversity such that full cooling load of all classrooms wings/floors, Media Center, Auditorium and administrative zones is included. For the Gymnasium and Café/Multipurpose room, at least 50% of the cooling load shall be catered in the total building cooling load.

23.2 OBJECTIVES

23.2.1 The following factors must be carefully considered in determining the most suitable type of system:
23.2.1.1 Simplicity of operation and maintenance
23.2.1.2 Operating costs, total energy analysis for normal operation
23.2.1.3 Equipment noise criteria (NC) level
23.2.1.4 Durability
23.2.1.5 Cost
23.2.1.6 Reliability of maintaining room comfort
23.2.1.7 For renovations, the best system for the existing building layout and envelope

23.3 DESIGN REQUIREMENTS

23.3.1 NEW SCHOOL
23.3.1.1 A - New schools shall be operating on a Direct Digital Control (DDC) system. All AHUs will have VFDs.

23.3.2 EXISTING SCHOOLS
23.3.2.1 A – Additions to existing schools shall be operating on a Direct Digital Control (DDC) system. If the existing system is pneumatic then it shall be upgraded to DDC. If there is a DDC system then the additions will have the same DDC system as the existing one. All AHUs will have VFDs.

23.3.3 SCIENCE LABS
23.3.3.1 A - Meet NCDPI standards for Science Classrooms.

23.3.4 GYMNASIUMS
23.3.4.1 A - Gymnasiums in K8s and Middle Schools shall be air-conditioned. The normal design load shall be for 60 people (equivalent of two classes). Gymnasiums shall have 2 AHUs; one shall cater for the normal design load, whereas the other will cater for the additional heat loads during events. However, second AHU cooling load shall not be catered in the chiller tonnage. Duct sox will be used in the Gymnasiums.

23.3.4.2 B - Gymnasiums in High Schools shall be air-conditioned. The normal design load shall be for 100 people (equivalent of two classes). Gymnasiums shall have 2 AHUs; one shall cater for the normal design load, whereas the other will cater for the additional heat loads during events. However, second AHU cooling load shall not be catered in the chiller tonnage. Duct sox will be used in the Gymnasiums.

23.3.4.3 C - VAV Boxes shall not be used in gymnasiums.

23.3.4.4 D - Ventilate gym storage rooms to prevent odors.

23.3.5 LOCKER ROOMS

23.3.5.1 A - The use of Energy Conservation applications is encouraged. Energy recovery ventilation units shall be included for locker rooms at middle, K8 and high schools. Locker room ventilation is not recirculated i.e. 100% OA capability.

23.3.5.2 Swimming Pools shall have their own dedicated Natatorium units. They shall also have their own dedicated cast iron boiler for hot water system. If the Gymnasium and swimming pool are housed in same building then they shall share the same boiler.

23.3.6 COMPUTER CLASSROOMS

23.3.6.1 A - Computer classrooms shall be designed at 1.5 times the normal classroom load.

23.3.7 TELECOMMUNICATION & NETWORK CLOSETS

23.3.7.1 A – All MDF & IDF shall operate on a cooling only VAV. In addition, a DX ductless mini-split unit (cooling only) with hard wired controller shall be installed in each room. This system shall have sufficient airflow to keep the room below 75 degrees Fahrenheit. A nominal 2.5 ton unit is required.

23.3.8 KITCHEN

23.3.8.1 A - The kitchen area shall have negative pressure to the surrounding areas.

23.3.8.2 B - The kitchen shall be served by a dedicated Roof Top Unit.

23.3.8.3 D - Kitchen hood ventilation shall meet applicable codes and minimize net exhaust air.

23.3.9 MAIN MECHANICAL ROOM

23.3.9.1 A - Main mechanical equipment room shall be mechanically ventilated.

23.3.10 CLASSROOM

23.3.10.1 A - All classrooms shall have a minimum of four (4) diffusers.

23.3.11 NOISE CRITERIA

23.3.11.1 A - Design noise criteria for the classrooms shall be 35 NC with HVAC equipment running.

23.3.11.2 B - Design noise criteria for the property lines shall be 55 NC with HVAC equipment running.

23.3.12 K-1 Toilet HVAC

23.3.12.1 A - When a design places single fixture toilet rooms on an exterior wall, provide ducted supply air to the space.

23.4 PRODUCTS

23.4.1 CHILLERS

23.4.1.1 B - Air cooled chillers for all new schools and additions. Above 300 Tons of building cooling load, use 2 air cooled chillers. Above 130 Tons use only screw compressor machines (minimum 2 compressors each). Scroll compressor chillers to be used only for less than 130 Tons building cooling loads. The chillers shall be selected catering to 110% of total building cooling load.

23.4.1.2 C - Compressors shall have manufacturer’s extended 4-year warranty in addition to the normal 1-year warranty. The condenser coils shall have extended 9 years warranty in addition to the normal one year warranty. The warranties shall cover material, labor and refrigerant.

23.4.1.3 D - Maintenance Service: Furnish repair services and first year manufacturers recommended equipment service of complete assembly for one (1) year from date of substantial completion.

23.4.1.4 E - All chillers shall include automatic reset/restart after voltage sag/interruption.

23.4.1.5 F - All chillers shall be set up with 30% current phase imbalance threshold.
MECHANICAL

23.4.1.6 G - Chilled water piping must be well insulated and must have a heat trace to protect piping from freezing on exterior installations.

23.4.1.7 H - All direct expansion (DX) Systems, package and split systems, must have low-pressure refrigerant control, manual reset – high-pressure control, a low ambient pressure control, and a crankcase heater.

23.4.1.8 I - Piping shall be installed with a tee connection, and isolation valve on the supply and the return chilled water piping, and isolation valves shall also be installed on the main chilled water supply and return piping to isolate a failed chiller. This will allow connecting to a portable chiller.

23.4.1.9 J - Arrange piping for easy access to disconnect, maintain or replace the compressor, and any chiller accessories.

23.4.1.10 K - Condenser control panel (outside air cooled chiller), extend concrete pad a minimum of 36” beyond the control panel to allow for a maintenance technician’s safety.

23.4.1.11 L - Utilize neoprene isolators beneath chillers, minimum 2.5” thickness.

23.4.1.12 M - A minimum of six (6) foot high chain link fence surrounding the high efficiency low noise air-cooled chiller(s) and other equipment in the chiller yard with a minimum four feet clearance around the equipment shall be installed to protect this equipment from vandalism.

23.4.1.13 N - Contractor shall spread gravel (coordinate with CMS on extents) around the chiller, heavy duty plastic cover shall be placed under the gravel, also gravel shall be placed between the chiller and the fence to prevent grass and weeds growing too close to the chiller which will result in difficulty of the air flow to pass through the chiller coils. Storm water drains shall be installed to prevent the accumulation of water in the gravel area.

23.4.1.14 O - Sound attenuation packages, if necessary, shall be designed to meet local zoning ordinances.

23.4.2 BOILERS

23.4.2.1 A - In new schools and additions, a minimum of two cast iron sectional boilers shall be installed (each sized at the full building designed heating load). Each boiler shall be sized at 110% of full calculated heat load.

23.4.2.2 B - It shall be the responsibility of the designer to select a boiler to accommodate the heating capacity needed to maintain a comfortable atmosphere in the building. Depending on the application and the availability of energy, the selected boiler shall be efficient and equipped with all necessary accessories.

23.4.2.3 C - Boilers shall have port to read gas pressure.

23.4.2.4 D - Burners shall be UL/FM/IRI approved for use.

23.4.3 PUMPS

23.4.3.1 A - Related documentation (Section: 4.16) HVAC Identification & Pipe Markers.

23.4.3.2 B - Pumps shall be equipped with high efficiency motors. Any motor that is controlled by a VFD shall have an Inverter Duty Motor. All motors shall be totally enclosed fan cooled (TEFC).

23.4.3.3 C - Secondary (building) pumping systems shall be equipped with VFDs, and parallel wired. Pumps shall be sized at 100% load for redundant operation at full load, two pumps minimum.

23.4.3.4 D - Primary (chiller) pumping systems shall be equipped with parallel standby pumps sized at 100% capacity each. The primary (chiller) pumps shall be controlled by the chillers to maintain warranty.

23.4.3.5 F - Packaged factory assembled pumping systems shall be evaluated on projects. Packaged pumping system shall be controlled by the Building Automation System (BAS). VFD’s shall be per acceptable manufacturer listings mentioned in CMS specifications.

23.4.3.6 G - Packaged factory assembled pumping systems shall have a minimum of three (3) feet clearance around the equipment for service.

23.4.3.7 H - On a primary-secondary pumping arrangement, to avoid confusion, the primary hot water and chilled water pumps shall be labeled HWP and CWP. The secondary hot water and chilled water pumps for the building shall be labeled BHWP and BCWP.

23.4.3.8 I - Provide positive freeze protection for all water systems subject to freezing conditions such as air cooled chillers, outdoor piping (above ground) etc.

23.4.4 AIR HANDLING UNITS

23.4.4.1 A - Variable air volume AHUs shall be equipped with a VFD control on the motor, and shall be direct digital control (DDC) compatible.

23.4.4.2 B - Single zone and Single Zone VAV AHUs with 4-pipe system should have a heating coil mounted on the discharge side of the cooling coil for possible dehumidification control. Dehumidification control is required for all air handlers.

23.4.4.3 C - AHU’s shall be equipped with economizer control. The control shall be “Enthalpy Differential” type.

23.4.4.4 D - All central station AHU’s shall have a minimum of six-row cooling coil.

23.4.4.5 E - Provide hinged doors between coils to enable repair/maintenance; minimum distance shall be 14”.

23.4.4.6 F - Preheat coils shall be utilized for all air handlers.

23.4.4.7 G - All AHU’s shall be supplied with adjustable sheaves for capacity adjustment if the unit is belt driven.
23.4.8 H - AHU’s shall be equipped with cog belts.
23.4.9 I - AHU’s shall be constructed of double wall, and shall be equipped with metal grid frames for media filter material.
23.4.10 J - All AHU’s shall have metal handles with door hinges as CMS standard.
23.4.11 K - Contractor shall clean the unit from the inside and the unit shall be free of dirt and debris before turning the project to the owner.
23.4.12 L - Access doors to filters shall open fully in order to enable the maintenance staff to reach, and change the air filters.
23.4.13 M - Mechanical Contractor shall provide any changes in the pulleys, belts, dampers, sheave or the addition of dampers, required to achieve design requirement without motor overload at no additional cost to the owner as part of the system T&B.

23.4.5 VARIABLE AIR VOLUME (VAV)
23.4.5.1 A - Variable air volume (VAV) system shall be adopted in all new schools and building additions system design.
23.4.5.2 B - In existing schools’ renovations / additions, Variable Air Volume (VAV) system is preferred, if the ceiling space allows. If there is not enough room above the dropped ceiling, then the designer shall consider another means of heating and cooling. VAV system may be applied in auditorium and cafeteria or multi-purpose areas for the purpose of energy savings. Any departure from VAV system for renovations / additions will need prior approval of CMS during SD phase of projects.
23.4.5.3 C - During school renovations, the existing HVAC Multi-zone or VAV system shall be upgraded to the current state of the art system and as required by the state code and guideline.
23.4.5.4 D - VAV throttling valves shall be of the sliding positive shut off type.
23.4.5.5 E - VAV applications, non-powered series units are preferred and shall be a pressure independent VAV Box.
23.4.5.6 F - Fan powered VAV units shall only be applied after approval of CMS engineers. When applied, they shall be of the parallel flow type.

23.4.6 ROOF TOP UNITS (RTUS)
23.4.6.1 A – RTUs may be used in addition / renovation projects. For new schools, RTUs shall only be used for kitchen. RTUs shall be DX cooling / gas heating type unless approved otherwise by CMS.
23.4.6.2 B - RTU shall be equipped with fully integrated, factory installed DDC controls that are BACNET or LonWorks compatible. Any gateway necessary to utilize BacNet or LonTalk will be supplied by the RTU manufacturer. RTU manufacturer shall make a controls technician available, onsite if necessary, to expedite the integration of the RTU controls and the EMS controls for CMS’s benefit.
23.4.6.3 C - Contractor shall clean the unit from the inside and the unit shall be free of dirt and debris before delivery to the owner.
23.4.6.4 D - RTU shall be equipped with multiple scroll compressors. Compressors or circuit shall be lead/lag. A compressor size shall not exceed 25 tons (nominal). RTU shall utilize high efficiency motors. RTU shall have multiple circuits. Refrigerant shall be R-410a, R-134a.
23.4.6.5 E - RTU shall be equipped with Liquid and Discharge service valves. Each circuit shall have liquid, suction and discharge valves for service and isolation.
23.4.6.6 F - All RTU’s shall have dehumidification and CO2 control.
23.4.6.7 G - Local factory service support shall be available within four hours. Additionally, a local factory controls technician for the rooftop equipment shall coordinate with the EMS contractor for integration.
23.4.6.8 H - Recommended spare parts list shall be submitted by the manufacturer.
23.4.6.9 J - Mechanical Contractor shall provide any changes in the pulleys, belts, dampers, or the addition of dampers, required to achieve design requirements without motor overload at no additional cost to the owner.
23.4.6.10 K - CO2 monitoring to be furnished with the RTU units.

23.4.7 FAN COIL UNITS (FCUS) & UNIT VENTILATORS (UVS)
23.4.7.1 A – FCUs / UVs shall only be used in renovation projects after obtaining prior approval of CMS during SD phase.
23.4.7.2 B - Units shall have a 3-speed switch (Hi-Mid-Lo) with no ‘Off’ position. Additional independent means of fan shutdown shall be incorporated. This is a fire code requirement
23.4.7.3 C - HVAC unit ventilator units shall be supplied with face and bypass dampers.
23.4.7.4 D - Control specifications to state humidistat to be installed in general areas served by Unit Ventilators.
23.4.7.5 E - Exposed ceiling hung units shall be supplied with double deflection grilles.
23.4.7.6 F - Ceiling hung ducted UVs in classrooms shall be flush with ceiling and have an exposed service grille on bottom.
23.4.7.7 G - FCUs and UVs heating coil on 4-pipe system shall be on the leaving side of the cooling coil for dehumidification control.
23.4.7.8 H - Fan Coil Units / Unit Ventilators shall not be installed above hard ceilings.
MECHANICAL

23.4.7.9 I - If fan coil and unit ventilators are used, the outside ventilation air shall be treated utilizing a dedicated outside rooftop DX unit. The design conditions for the outside air will be 82 degrees F and 130 grains per pound dry air.

23.4.8 EXHAUST & SUPPLY FANS
23.4.8.1 A - Roof exhaust and supply fans shall be fabricated from heavy gauge aluminum. Hood shall be removable and accessible. Exhaust fans to be installed at least 15 feet away from all air intakes.
23.4.8.2 B - Fans shall be furnished with prefabricated roof curb, curb shall be constructed of aluminum with rigid fiberglass insulation and shall be self-flashing. Curb height shall be minimum 8” above finished roof and shall be constructed to conform to the roof slope.
23.4.8.3 C - Contractor shall anchor the ventilator to curb with stainless steel or cadmium plated screws, minimum two (2) per side.
23.4.8.4 D - Ceiling exhaust fans shall have galvanized steel housing, sound absorbing insulation, white grille, and outlet duct collar.
23.4.8.5 E - Belt driven fans shall be supplied with adjustable sheaves for capacity adjustment.

23.4.9 GRILLES & Registers
23.4.9.1 A - Grilles and registers shall be fabricated from steel or aluminum with horizontal steel louvers, spaced ¾” on centers and fixed 35 degrees deflection.
23.4.9.2 B - Grilles and registers faces shall have baked enamel factory painted finish.

23.4.10 DIFFUSERS
23.4.10.1 A - Diffusers shall be square, adjustable pattern, multicore type to discharge air in 360 degrees pattern.
23.4.10.2 B - Linear slot diffusers shall only be used in special applications, only with CMS approval.
23.4.10.3 C - Diffuser shall be fabricated of steel and shall have off-white baked enamel factory painted finish.
23.4.10.4 D - Provide diffusers with inverted T-bar type frame. In gypsum board ceilings, provide ceiling frame.
23.4.10.5 E - All diffusers in the kitchen area shall be perforated, and aluminum type to prevent corrosion.

23.4.11 KITCHEN HOOD
23.4.11.1 A - For new construction, CMS requires under the hood to have kitchen utility distribution system. In renovation projects utility distribution system should be used, with prior approval from CMS. The Mechanical Contractor shall install the hood and Utility Distribution System which would be supplied by the Food Service contractor. The UDS allows for one point of connection for all the utilities. The Mechanical Engineer shall coordinate electrical power and control wiring with the Electrical Engineer. Switches for the fans and lights will need to be field wired to the prewire package by the electrical contractor. Kitchen exhaust and make-up hood design shall comply with all the requirements of sections 507 and 508 of the North Carolina Mechanical Code. CMS has determined that makeup air will be tempered to 55 degrees if the incoming air is less than that temperature.
23.4.11.2 B - Kitchen hood shall be eyebrow type. Provide a UL listed canopy type exhaust hood, sized per drawings to overhang equipment. Hood shall feature exposed surface 304 stainless steel, stainless steel UL baffle filters, integral insulated supply air plenum with combination UL listed fire/volume dampers, vapor proof UL listed light fixtures, stainless steel closure panels between hood and ceiling, integral grease gutters sloped to drain to grease receptacles, and a properly sized fire protection system to be provided to the hood supplier for installation, which shall meet UL 300 standards. Include a solenoid activated mechanical gas valve shutoff and micro switch for shutdown of electric equipment. Micro switch shall be double pole and double throw. There shall be an On/Off switch for the kitchen hood for manual operation by remaining within the scheduled occupied hours.

23.4.12 AIR FILTERS
23.4.12.1 A - General: The mechanical contractor shall provide “PERMANENT AIR FILTER FRAMES” with “throw away MERV-8 media” to fit the standard filter sizes required by the manufactures of the HVAC equipment utilized on the project. The Contractor shall provide four (4) complete media changes, as regular filter changes are required during construction and a final filter media change at the date of acceptance by the Owner.
23.4.12.2 B - Tuck-In Metal Frame. The “permanent frames” shall be of 26 gage. Galvanized metal design. Frame will consist of a rigid channel no rivet construction as manufactured by United Air Filter Company using a spring-tensioned media-retaining grid incorporating a 16 gage. (.10” x 1.0”) galvanized wire, which provides a compression-type seal. Filter shall be sized accurately to meet the filter rack dimensions. Permanent frames shall be 1/2”, 1.0” and 2.0” of thickness of the HVAC equipment to which they are applied.
23.4.12.3 C - Filter Media shall consist of, or be equal to Bruce Air Filter BF-090 polyester filter. Filter media shall be 100% virgin polyester fiber manufactured by the Rando-Webber air layered process or an approved equal air-laid process. Filter media shall be a multi-denier, gradient density with a minimum loft of 7/8” and weigh 11.25 ounces per square
yard, plus or minus 10%. Media shall have a non-migrating, heavy dry tackifier on the downstream side. It shall have a MERV of 8 @ 300 fpm (30% efficiency) with a maximum initial resistance of 0.25” w.g. as tested in accordance with ASHRAE Standard 52.2. Media shall have a minimum average arrestance of 90%. Media shall be classified UL-900 Class II.

23.4.13 HVAC IDENTIFICATION & PIPE MARKERS
23.4.13.1 A - In all existing schools renovations, engineers shall check the existing equipment numbers and start the new equipment numbers as a continuous sequence, for example in a school if the last air handling unit number finished with AHU-5 the new number shall carry from their AHU-6, and that shall be similar for fans, pumps, boilers, chillers, fan coil units, unit ventilators and other equipment.
23.4.13.2 B - In all new schools equipment shall be identified as air cooled chiller (ACCH), boiler (B), pump (P) in the pumps case the engineer shall specify on the schedule whether the pump is a condenser pump, primary or secondary pump, air handling unit (AHU), rooftop unit (RTU), unit ventilators (UV), fan coil unit (FCU), exhaust fan (EF), supply fan (SF), condensing unit (CU), variable frequency drive (VFD), variable air volume (VAV), energy recovery ventilation unit (ERV), and kitchen hood supply fan (KSH), and kitchen hood exhaust fan (KEH).
23.4.13.3 C - If the school contains multiple wings identified as A, B, C, D wings the units shall be identified as AHU-A-1, AHU-B-1, etc. and that shall be the same for all equipment in each unit.

23.4.14 ISOLATION VALVES
23.4.14.1 Provide and install mechanical system isolation valves for each wing / floor/ area facilitating easy access, maintenance, and repair of equipment. Isolation valves shall be reachable from a 10-foot step-ladder. A phenolic tag (3 in x 2 in) shall visually identify isolation valve location with the valve number engraved on it and permanently attached by screws to the ceiling grid directly under the valve(s). Hot water tags shall be red. Chilled water tags shall be blue. Domestic water tags shall be green.

23.4.15 HYDRONIC PIPING
23.4.15.1 All underground piping shall be insulated and jacketed, and shall be Ricwil system or approved equal. No PVC piping for underground will be used.
23.4.15.2 All pressure relief piping shall be directed to the floor unless Code requires otherwise.
23.4.15.3 Exposed piping shall be protected from freezing by insulation and heat tracing when necessary.
23.4.15.4 All temperature and pressure gauges, and sensors installed on equipment and piping shall be no higher than 6’ above finish floor for access and reading. Temperature and pressure gauges above 6’ shall have remote read out located in the mechanical room at a central location. The remote read-outs shall be clearly marked with the appropriate reference to the temperature or pressure gauges from which they are receiving the information. Standing on the equipment or high ladder for a read out is not acceptable.

23.4.16 DUCTWORK SYSTEMS
23.4.16.1 Plenum return air shall be used. Create sound traps between spaces.
23.4.16.2 Maximum length of flexible ductwork shall be five (5’) feet.
23.4.16.3 On multi-zone units, manual-balancing dampers shall be installed on each zone ductwork near the AHU.
23.4.16.4 Exposed supply and return air ductwork shall be spiral, and shall be installed at highest point possible.
23.4.16.5 Fabric duct shall be used for K8, Middle and High School gyms and other areas where applicable. It will also be used for Elementary School multi-purpose rooms and other areas.
23.4.16.6 On renovation projects, ductwork to remain shall have the open ends sealed and taped as soon as possible. Remaining ductwork shall be cleaned by vacuuming the bottom and sides.

23.5 INSTALLATION STANDARDS
23.5.1 Refer to manufacturer’s installation specification for complete installation procedure.
23.5.2 In order to reduce field labor and related construction impacts, AHUs, UVs, and FCUs, controls shall be specified to be factory mounted and tested, readily accessible for service.
23.5.3 AHUs, UVs, FCUs, Pumps, Boilers, Air cooled Chillers, and all other system components requiring service or replacement shall be specified to be installed with isolation valves, flanged or union connections, and pressure and temperature gauges.
23.5.4 Whenever dissimilar metals are connected a dielectric union shall be installed.
23.5.5 All system components exceeding 50 pounds shall be installed in accordance with seismic requirements.
23.5.6 All materials installed on roofs or canopies, i.e. piping or duct, shall have a minimum of 12” clear for roofing maintenance.
MECHANICAL

23.5.7 There shall be a maximum of 24” and a minimum of 12” between the supply and return piping at the chilled water or hot water decoupling loop.
23.5.8 The VFD’s shall be in same room as motor and not greater than 25’ away.
23.5.9 No combustible material shall be used above ceilings.
23.5.10 Condensate drain lines shall be copper. Copper is allowed for drain lines not at floor or ground level. Drain lines shall run to floor drains. Drains lines shall maintain proper pitch ¼” per 100’ to allow the proper flow of condensate to the drain. Condensate pumps are allowed only if there isn’t enough room for a condensate line pitch. Water spills on the floor shall not be acceptable.
23.5.11 A humidity sensor shall be installed in the return air duct of all AHUs for humidity control.
23.5.12 VAV boxes should be mounted within 18” of the drop ceiling for maintenance purposes.
23.5.13 Where possible, install VAV boxes on or near walkways or decks above hallways for ease of maintenance.
23.5.14 Automatic valves shall have a visual indication of valve position relative to the pipe flow that can be seen from floor level.
23.5.15 All valves on water systems installed for service to equipment or to isolated areas shall be installed within 18” of the drop ceiling and no higher than 12’ from the floor with no ceiling.
23.5.16 Air handling units mounted 16 feet or higher above finished floor shall have maintenance platforms for convenience and safety. Provide permanent access to platforms.
23.5.17 Pump layout and installation shall have maintenance clearance of 36” minimum all directions around as a first consideration for future maintenance.

23.6 START UP

23.6.1 Fully trained service technicians employed or recommended by the manufacturer’s representative(s) providing the main mechanical room equipment such as boiler(s), chiller(s), pump(s), etc. shall perform start up (Chillers only by manufacturer technicians). After start up, technicians shall complete start up form and mail three (3) copies to CMS/Building Services, Warranty Dept., 3301 Stafford Drive, Charlotte, NC 28208 for file verification (and included in the closeout manuals). A second start up shall be done at a mutually agreed upon time when a more consistent load will be available. A second set of three (3) start up reports shall be sent to the CMS/Building Services, Warranty Dept., 3301 Stafford Drive, Charlotte, NC 28208 for file verification. This start up shall note any deficiencies and corrections to the initial startup. Manufacturers’ representative shall warrant all equipment to be free from defect.
23.6.2 Per Building Standards, there shall be an automatic means of controlling the HVAC equipment during construction for unoccupied periods. Therefore, the control system shall provide this control or temporary time clocks shall be installed to cycle the equipment off during unoccupied hours.

23.7 TESTING AND BALANCING

23.7.1 Note: Work in this section will be contracted directly by the General Contractor or CMAR and NOT by the Mechanical Contractor. The Mechanical Contractor shall coordinate work with the Testing and Balancing Agency.
23.7.2 Testing and balancing shall be performed by a fully Certified, Independent, Test and Balancing Agency. Certification shall be from AABC or NEBB.
23.7.3 Mechanical Contractor shall provide any changes in the pulleys, belts, dampers, sheaves or the addition of dampers, required to achieve design requirements without motor overload at no additional cost to the owner.
23.7.4 All punch lists from the Test and Balance agency shall be submitted to the CMAR / GC and copies shall be sent to the Mechanical Contractor, CMS, Commissioning Agent and the A/E for information purposes.
23.7.5 The General Contractor or CMAR will NOT be able to achieve substantial completion until the Test and Balance final report is completed, submitted, and verified by the Commissioning Agent and the Engineer of Record.
23.7.6 Commissioning Engineer, at his discretion, may request a recheck or resetting of any outlet, supply or return air fan, or exhaust fan, or any hydraulic flow as listed in test report. Provide technicians to assist the Commissioning Engineer in making any tests required during this period of time. This recheck shall also include a spot check of the actual field balance with the Commissioning Engineer. Allow for spot-checking 25% of documented flow rates.

23.8 COMMISSIONING

23.8.1 CMS has incorporated a Commissioning Program for all of its Capital Improvement Program schools. CMS shall hire an independent Commissioning Agent, however this shall not relieve the contractor or the engineer from their responsibilities. The Architect shall incorporate into each project specifications defining the commissioning plan
provided by the Commissioning Agent. It will be the responsibility of the HVAC contractor to provide all required labor and/or material to comply with the commissioning plan.

23.8.2 For details of commissioning requirements, refer to relevant specification.

23.9 OPERATION/MAINTENANCE MANUALS AND TRAINING

23.9.1 When the project is 50% complete, it shall be the contractor’s responsibility to provide and submit two (2) copies of the operation and maintenance manuals to the engineer for review. Once the review by the engineer is completed, one (1) manual shall be delivered to the CMS for their record, and one (1) manual the engineer will keep.

23.9.2 Operation and maintenance manuals shall be organized in 3 ring binders, in the index order of the project manual. Each Spec section shall be separated with a numbered divider tab matching the project manual index and shall include approved copies of all product data, shop drawings, cut-sheets and operating and maintenance instructions for all equipment and materials (including sizes) that were installed in the project.

23.9.3 Startup sheets for all HVAC equipment chillers, boilers, VFD’s, etc., shall be included in operation and maintenance (O & M) manuals and the warranty/closeout manual. All approved equipment suppliers shall maintain technical service manuals.

23.9.4 The Mechanical Contractor will provide on-site operator/maintainer training to CMS HVAC technicians through respective OEMs. All training shall be videoed by contractor or CMAR and 2 copies submitted to CMS.

23.9.5 Following the installation of any HVAC system the contractor shall provide at the main mechanical equipment room valve chart(s), sequence of operation, piping schematic(s), and control diagram(s). These items shall be reduced copies, 11"x17” in size and shall be in a laminated cover.

23.9.6 The mechanical contractor shall install a drawing holder in a convenient location in the main mechanical room. The drawing holder shall consist of a 4” PVC pipe of sufficient length to hold the mechanical drawings. The drawing holder shall have PVC pipe plug screwed into each end. The mechanical contractor shall place “Construction Record” drawings in the drawing holder when available. Contract drawings shall be in the drawing holder until replaced by “Construction Record” drawings. NCDOL Boiler Inspection Certificates shall be framed and mounted in the boiler room.

23.9.7 A – The following information / documents shall be required to be submitted separately to CMS HVAC; this is additional to the Maintenance Manuals:

23.9.7.1 Safety instructions.
23.9.7.2 Detailed spare parts lists (e-copies in MS Excel format) of each equipment.
23.9.7.3 Tabular list of warranties of each equipment (e-copy).
23.9.7.4 PM inspection procedures.

23.10 DEMOLITION STANDARDS

23.10.1 The owner reserves the right to reclaim refrigerant and oil prior to demolition. If the owner does not want refrigerant to be reclaimed, the Contractor shall be responsible for reclaiming refrigerant and refrigerant oil in conformance with all applicable laws and regulations. Contractor shall recycle or dispose of refrigerant and refrigerant oil in a lawful manner, completing all documentation regarding refrigerant. One copy of all documentation regarding refrigerant and refrigerant oil shall be forwarded to Owner for record keeping.

23.10.2 This shall apply to all units containing refrigerant and refrigerant oil including, but not limited to: chillers, freezers, coolers, water coolers, air dryers, window units, heat pumps, split units, and ice machines.

23.10.3 Owner has the right of first refusal on all HVAC / mechanical equipment unless specifically stated in the project documents.

23.10.4 Chillers shall have the piping seal welded shut with a ¼” Swagelock fitting for gas blanket. DX equipment shall have the refrigerant piping sealed.
INTRODUCTION
Division 26 is the electrical portion of this Standard. It is intended to assist a qualified Electrical Engineer in the preparation of drawings and specifications for the electrical and electronics systems to be included in school construction. It is not intended to serve as a code book or a construction specification. It also does not relieve the Electrical Engineer of his responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 26 is compiled primarily to describe electrical systems for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of electrical renovation. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

26.1 CODES AND STANDARDS

26.1.1 Abide by all applicable codes
26.1.2 Charlotte-Mecklenburg Building Standards Department and Department of Public Insurance (DPI) are responsible for the enforcement of the North Carolina State Building Code. These Departments reviews plans, issues construction approval, permits, perform periodic inspections, authorize utility connections and issues certificates of occupancy.

26.1.3 Electrical Plan Review personnel offer the following suggestions to expedite review and approval of electrical design drawings:

26.1.3.1 Show clearance lines (or dimensions) for electrical equipment on plan views drawn to scale. Show compliance with the NEC.

26.1.3.2 For each service and each feeder provide a load tabulation on the drawing. Indicate SCCR and AIC rating for all equipment. Perform fault current analysis.

26.1.3.3 Where a load tabulation includes an allowance for existing facilities, show how the allowance was determined.

26.1.3.4 Where a new switch or circuit breaker is added to existing service equipment, show its relationship to existing main devices.

26.1.3.5 Where an existing service is being utilized or modified, show the existing arrangement.

26.1.3.6 A four-hour wall can be considered the beginning of a separate building.

26.1.3.7 Designate ceiling plenum areas where plenum rated equipment will be required.

26.1.3.8 Separate rooms or closets for electrical equipment are preferred. Rooms labeled as Electrical shall have no other purpose.

26.1.3.9 Electrical Inspection personnel offer the following code interpretations and decisions commonly applicable to electrical construction in Schools:

26.1.3.9.1 For each service provide a minimum of two driven ground rods as the “made electrode” to supplement the water pipe electrode. The rod must be outside the building and not under a canopy. Ground rods eight feet in length must be driven flush with, or below, grade level and must include a clamp listed for direct burial. It would be helpful if rod and clamp were not completely covered until after inspection.

26.1.3.9.2 Grounding electrode conductor shall be a minimum of #4 AWG solid.

26.1.3.9.3 Bond each utility current-transformer cabinet to the grounding electrode system or to the service neutral with a conductor sized per the NEC.

26.1.3.9.4 Steel building frames may not be utilized as the supplemental electrode, but must be bonded to the grounding electrode system. Two or more steel building frames that are isolated from each other shall be bonded together.

26.1.3.9.5 Grounding electrode conductors which are installed in metal raceways must be electrically continuous per NEC.

26.1.3.9.6 Use a bonding hub at the electrode, and a bonding locknut at the service equipment enclosure.

26.1.3.9.7 Provide a grounding electrode conductor per the NEC to each transformer, or to the secondary overcurrent device or disconnect.

26.1.3.9.8 At each transformer or the first disconnecting means, connect the grounding electrode conductor, equipment grounding conductors, and neutral conductor together at one point on the enclosure.

26.1.3.9.9 Service equipment shall be labeled as suitable for use as service equipment.

26.1.3.9.10 In order to apply 75 degrees C insulated conductors at their 75 degrees C rating, the equipment terminals at both ends must be rated 60/75 degrees C or 75 degrees C. If the terminal is rated 60 degrees C only, the conductor must also be sized as if it had a 60 degrees C rating.

26.1.3.9.11 Bundling of wires in panel boards in excess of 24” in length will cause them to be subject to the de-rating requirements of the NEC. Receptacles are not required in group Restrooms, but if provided they must be protected by ground fault circuit interrupters. Student Restrooms are better off without receptacles, locate in the adjacent corridor when possible.
ELECTRICAL

26.1.3.9.12 Weatherproof GFCI type receptacles should be provided on roofs within 25 feet of Heating, Air Conditioning and Refrigeration Equipment. They are not required for ventilation and exhaust fans and the intake and exhaust for a Kitchen Hood.

26.1.3.9.13 Panel directories shall reference room names and numbers actually assigned on door tag and signage, not the room numbers used on Construction Floor Plans.

26.1.3.9.14 Lay-in Lighting Fixtures shall be supported from the overhead structure. One wire per corner minimum.

26.1.3.9.15 Panels fed from a utility transformer must be service rated.

26.1.3.9.16 Panels fed from an existing panel in a different building must be service rated or no continuous metallic pathway between the two buildings with a separately provided ground rod provided.

26.1.3.9.17 Circuit breakers for Fire Alarm System circuit must be red and must be dedicated.

26.1.3.9.18 Energy efficiency should be considered per the latest edition of the NCECC standards. Also, while LEED designation is not being pursued, LEED-NC and EB design criteria should be considered.

26.1.3.9.19 Provide an Arc Flash Analysis per NFPA 70E and OSHA 29 CFR 1910 and label all panels accordingly with the specific hazard level. Provide overcurrent protective device coordination study for the entire power distribution system, with emphasis on all life safety generator backed up systems.

26.2 ELECTRICAL SERVICE

26.2.1 As the predominant electrical utility in Mecklenburg County, Duke Power Company’s procedures and standards are described herein. Projects in and near the Towns of Cornelius, Huntersville, and Pineville may be served by their respective Towns; and Union Electric Membership Corp. serves a portion of Mecklenburg County adjacent to Union County.

26.2.2 The initial Duke Power Company contact should be the Marketing Account Executive for Charlotte-Mecklenburg Schools. They will be the overall coordinator for Duke Power Company and will advise the Duke Power engineering office to be contacted. For existing schools, they can also provide information on the electrical KW demands.

26.2.3 Preferred Service Arrangement:

26.2.3.1 For new schools, one service is preferred. However, consideration should be given for a second service for out-buildings and outdoor air-conditioning chillers.

26.2.3.2 Pad mount transformer delivering 480/277 volt, 3 phase, 4 wire service, or 208Y/120 volt, 3 phase, 4 wire service, depending on the size of the building.

26.2.3.3 Standard concrete pad details shall be obtained from the utility company.

26.2.3.4 Duke Power Engineer will determine whether or not a “pit box” will be required.

26.2.3.5 Locate transformer within the fenced-in utility area that includes the chiller(s). Provide weatherproof GFI receptacle in enclosure and photocell controlled outdoor luminaire for the utility area.

26.2.3.6 Duke Power personnel will provide their standard padlock for the chain that secures the gate for the fenced utility area. The Duke Power padlock and the Charlotte-Mecklenburg Schools padlock will be installed in tandem so either lock can be used for access to the utility area.

26.3 UTILITY METER

26.3.1 Locate within the same fenced-in utility area as the transformer, wall mounted if possible.

26.3.2 Provide 1 ¼” conduit from meter box to secondary side of pad mount transformer.

26.3.3 Charlotte-Mecklenburg Schools requires that new meters be the pulse type. This requirement should be indicated on the electrical drawings with the statement that the electrical contractor request the installation of the pulse meter when coordinating with Duke Power Company.

26.3.4 The pulse meter installation will include a small relay box nippled to the meter box. Provide #18 AWG stranded pair cable in conduit from the relay box to the Energy Management System Controls. The necessary wiring connection of the pulse relays to the Energy Management System is the responsibility of the HVAC Controls Subcontractor under Division 23. Only the main meter shall be monitored. Coordinate with the CMS project manager if there are multiple “mains” provided and which need to be specifically metered.

26.3.5 Provide a breakdown of the connected load for each service to the Duke Power Engineer, including largest motor, winter load, summer load, lighting, kitchen equipment, HVAC, receptacles, and miscellaneous power.

26.3.6 Service shall include provisions for load growth of 25% in the form of excess conductor capacity, or with spare conduits for future parallel service conductors. Spare conduits for future paralleling should be tagged with actual conductor lengths for each phase and neutral. Switchboard busses shall be sized for 25% future growth. In sizing the feeders, consider NEC Article 220.86 with respect to applying demand factors applicable to schools.

26.3.7 Electrical service shall be underground in concrete encased PVC from power company transformer to main service equipment. Minimum depth of 36”.
ELECTRICAL

26.3.8 Electrical service requirements for mobile units shall be coordinated with the owner.
26.3.9 Existing schools with multiple services and/or multiple meters:
26.3.9.1 Show all meter locations on the Electrical Site Plan. At the conclusion of the project, add the utility’s meter numbers to the Site Plan record drawing.
26.3.9.2 Analyze new and existing services for combination of metering where economically feasible.
26.3.9.3 Arrange for a site visit with the Charlotte-Mecklenburg Schools Electrical Engineer and the Duke Power Engineer to observe the existing and proposed new service and metering arrangements. This shall be done during the design development phase of project.

26.4 CONDUCTORS FOR SERVICE, FEEDERS AND BRANCH CIRCUITS

26.4.1 Branch circuit conductors shall be copper. Although copper feeder conductors are preferred, aluminum conductors shall be considered as an acceptable alternate to copper and the cost of both materials quoted subject to the requirements in specification 260519.
26.4.2 Insulation for copper conductors THWN/THHN.
26.4.3 Type AC, NM and NMC cables shall not be used.
26.4.4 Limited use of MC cable is allowed for above ground interior lighting and receptacle branch circuits. Work shall be per the NEC with the additional restrictions listed in specification 260519.
26.4.5 Feeder shall be sized for load growth of 25%. All panelboard busses served by feeders with future growth shall be sized accordingly.
26.4.6 Branch power circuits shall be a minimum of #12 AWG.
26.4.7 Use stranded conductors for all power wiring.
26.4.8 Run a separate neutral for each 120V circuit.
26.4.9 Each branch or feeder circuit shall have a green equipment-grounding conductor sized in compliance with the NEC.
26.4.10 Backstabbed (quick wired) outlets and switches shall not be used.
26.4.11 When doing demolition, remove unused circuits (wiring and conduit) back to source. Conduit in slabs should be cut off flush with surface. Repair concrete with grout.
26.4.12 All underground wiring shall have marker tape buried 6” below finished grade and directly above underground wiring conduits.
26.4.13 All wiring shall be color coded. For 120/208V – phase A black, phase B red, phase C blue, neutral white. For 277/480V – phase A brown, phase B orange, phase C yellow, neutral gray. Ground conductor on all systems shall be green. Insulation for #6 AWG and smaller conductors shall be suitably colored in manufacturing. #4 AWG conductors and larger may be identified with bands of proper color plastic tape near each termination and in each junction box. Low voltage color coding shall be as follows:
26.4.13.1 Fire Alarm – Red
26.4.13.2 Intercom - Off White
26.4.13.3 Security - see specifications for color coding required.
26.4.13.4 Cable TV- Black
26.4.13.5 DDC - Purple/Yellow
26.4.14 Show location of all exterior underground power circuit wiring on as-built drawings including hand hole locations.

26.5 COMMUNICATIONS AND LOW VOLTAGE SYSTEMS CABLEING

26.5.1 All Communications and Low Voltage Systems Cabling shall be plenum rated unless noted otherwise. Non-plenum is acceptable for Fire Alarm Cabling installed entirely in conduit.
26.5.2 All Communications and Low Voltage Systems Cabling shall be routed in cable trays where provided above suspended ceilings unless noted otherwise.
26.5.3 All Communications and Low Voltage Systems Cabling not concealed above a suspended ceiling shall be routed in raceways.
26.5.4 Do not run low voltage cabling underground unless given specific direction to do so from CMS. This includes but is not limited to fire alarm, intercom, data and security cabling.

26.6 PANELBOARDS AND SWITCHBOARDS

26.6.1 Panelboards shall be dead-front type with copper bussing. Hinged fronts (trims) are preferred.
26.6.2 Panelboards shall have main circuit breaker unless it is fed from another panel in the same room and labeled as such.
26.6.3 Panelboards shall be located in equipment rooms or kitchens. Avoid installations in corridors, classrooms and other finished areas. Panelboards in equipment rooms shall be surface mounted. Panelboards in kitchens shall be flush mounted. Mount panels so top is at 6'-6” A.F.F. A minimum of 36” unobstructed access shall be provided at the front of the panelboard.

26.6.4 All flush mounted panelboards shall have a minimum of five empty ¾” conduits stubbed out into the ceiling space above the panel for future use. Seal ends of conduit with caps.

26.6.5 Busses in panelboards and switchboards shall be considered “A”, “B” and “C” from left to right, top to bottom, or front to back when facing equipment.

26.6.6 Load centers shall not be installed without approval of CMS Electrical Engineer.

26.6.7 Lighting panelboards shall contain only lighting circuits. All other loads such as receptacles and mechanical equipment shall be served from separate panelboards.

26.6.8 Switchboards shall have group mounted branch circuit breakers.

26.6.9 Switchboards shall have copper bussing.

26.6.10 A housekeeping pad shall be provided for switchboards. Minimum of 4” high.

26.6.11 Unobstructed access shall be provided to switchboards per NEC.

26.6.12 Panel board and Switchboard Directory cards shall be neatly typed. Space typing on card so all is visible when inserted into frame. Panelboard and Switchboard directories must be updated with each project. Do not use “white-out” or scratch out existing information. Do not use pencil to update. Retype entire schedule if necessary. Directories will list specific device and location. e.g. “Receptacles Rm 123” not generic “Receptacles”.

26.6.13 New panels shall be designed with a minimum of 15% spare 20A single pole breakers and 15% blank spaces unless otherwise approved by CMS Electrical Engineer.

26.6.14 New panels shall be 42 pole minimum unless otherwise approved by CMS Electrical Engineer. An exception would be emergency panels and similar locations where very few breakers are needed and minimal growth is expected.

26.6.15 The main service entrance switchboard shall have a main breaker and a digital display for voltage and amperage.

26.7 TRANSFORMERS

26.7.1 Dry Type Distribution

26.7.1.1 Housekeeping pad shall be provided. Minimum of 4” high.

26.7.1.2 See specification 262200 for requirements.

26.7.2 For new construction or renovations that require a building to be sprinkled, by the building code, the main electrical room and emergency ATS room need not be sprinkled if it has a minimum of a 2 hour rated wall. This is the preferred arrangement. All other electrical rooms shall be sprinkled.

26.8 CIRCUIT BREAKERS

26.8.1 Interrupting capacity for circuit breakers shall be determined by the coordination study.

26.8.2 Panel boards shall utilize bolt-on type breakers.

26.9 DISCONNECT SWITCHES

26.9.1 Switches shall be heavy duty.

26.9.2 Switches enclosures shall be NEMA 3R for outdoor use.

26.9.3 Switches enclosures shall be NEMA 4 for kitchen equipment.

26.10 ACCEPTABLE EQUIPMENT MANUFACTURERS (others need to be approved by CMS Electrical Engineer):

26.10.1 Square D Company

26.10.2 Eaton/Cutler Hammer

26.10.3 Siemens ITE

26.10.4 General Electric

26.11 WIRING DEVICES – CONVENIENCE OUTLETS
26.11.1 Receptacles shall be specification grade NEMA 5-20R, side wired with high impact thermoplastic face. Color shall be gray unless installed in ivory wire mold, then color shall be ivory. Ground fault interrupter receptacles shall be used outdoors and adjacent to sinks indoors.

26.11.2 Device plates shall be standard size 302 stainless steel. Use midi size plates.

26.11.3 Receptacles shall be recessed in wall on new school construction projects.

26.11.4 Locate convenience outlets in all occupied spaces other than Student’s Restrooms, Locker Rooms, Swimming Pools, Time Out Rooms, small Closets and small Storage Rooms.

26.11.5 Mounting height for devices shall comply with current ADA requirements.

26.11.6 In Offices, Workrooms, and Conference Rooms provide widely-spaced convenience outlets to result in approximately one outlet for each 50 square feet of floor area, with minimum of two.

26.11.7 Provide a duplex outlet at each end of large fixed tables in workrooms. Provide a blanked data wiring box at one end only. Architectural plans shall provide a wiring chase for the electrical and data cabling.

26.11.8 Provide one duplex receptacle within 25’ of each piece of mechanical and plumbing equipment. Also provide one or more duplex convenience receptacle in each boiler room depending on the size of the room.

26.11.9 Provide an outlet at least every 50’ in corridors, and open wall locations, i.e., large spaces such as media center, gymnasiums, dining area, etc.

26.11.10 Provide a weatherproof GFI outside outlet near every main outside door and near any outside mechanical equipment. As a school’s design dictates provide additional outside outlets. Provide inside outlets within 10’ of any outside doors.

26.11.11 In addition to the dedicated 120VAC, 20A duplex and quad receptacles required in data rooms, provide 120VAC, 30A dedicated circuit with an L5-30R receptacle.

26.11.12 MDF: (2) L5-30R, 80” aff, (4) quad receptacles 80” aff, (4) quad receptacles 18” aff, (2) duplex receptacles 48” aff.

26.11.13 IDF: (1) L5-30R, 80” aff, (2) quad receptacles 80” aff, (4) quad receptacles 18” aff, (1) duplex receptacle

26.11.14 Grounding pin of receptacles shall be in the “down” orientation.

26.12 WIRING DEVICES – LIGHT SWITCHES

26.12.1 Toggle switches shall be specification grade 120/277V, side wired with high impact thermoplastic handle. Color shall be gray.

26.12.2 Device plates shall be standard size 302 stainless steel.

26.12.3 Switches shall be recessed in wall on new school construction projects.

26.12.4 Locate switches for Corridors and group restrooms in an Office, a Workroom, or a similar area not subject to student’s tampering. Key operated switches may be appropriate in Corridors of Building Additions.

26.13 WIRING DEVICES – MISCELLANEOUS

26.13.1 Clock receptacles need no longer be provided. Battery operated clocks shall be supplied by Charlotte-Mecklenburg Schools.

26.13.2 Provide a door bell and chime as standard at the kitchen back door. Devices will be commercial grade.

26.13.3 Provide pathways and cabling for the owner provided HELIOS system at the front entry door. See appendix for detail drawings and coordination.

26.13.4 Occupancy Sensors

26.13.4.1 Provide energy study to CMS for Review.

26.13.4.2 As a normal practice, provide vacancy sensor or off delay timer switches for irregularly occupied spaces as is appropriate and required by the energy codes. This may include data, server, conference and storage rooms, restrooms (except elementary school group toilets) and offices. The arrangement should include manual over-ride capabilities. Sensors with dual sensing technology are preferred and off delay should be set to 30 minutes. Do not use occupancy sensors in electrical or mechanical rooms where they may create a hazard.

26.13.4.3 Upon request by CMS, occupancy sensors are to be included as an alternate for other regularly occupied spaces where they may be desirable, but are not required by the energy codes.

26.13.4.4 Provide pathways (3/4”) and double gang box with single gang reducer mounted at 48” AFF to center of outlet located in the kitchen area and the admin area. Kitchen area location shall be near the cafeteria manager’s office, away from possible damage from delivery carts and excessive heat/moisture.

26.14 STANDBY ENGINE-GENERATOR SET

26.14.1 An on-site Standby Engine-Generator Set shall be provided for each new school in compliance with NEC Article 700.
ELECTRICAL

26.14.2 Generators will include an automatic transfer switch (ATS) for life safety functions only. An equipment/auxiliary transfer switch should only be considered where loss of power could cause considerable damage to the building as with certain sump pumps or sewage lift stations.

26.14.3 If the ATS is located in a separate room, the building code requires this room to be sprinkled which is not desirable. It is preferred that this ATS be located in the main electrical which requires its’ clearances to be doubled. The main electrical room should not be sprinkled, but requires a minimum of a 2 hour rated wall.

26.14.4 CMS will determine if a Generator should be provided when doing an alteration or addition to existing schools.

26.14.5 Design Engineer to submit Generator sizing calculations to CMS for review. The generator shall have a minimum of 25% excess capacity and be no smaller than 20KW.

26.14.6 Locate the Engine-Generator Set in a weather-protective enclosure, outdoors on a concrete pad enclosed by a chain-link fence. The same fenced-in area as the pad mount transformer and chillers is preferred.

26.14.7 Generator fuel system is natural gas where available. Consider diesel or liquid propane where natural gas is not available.

26.14.8 Generator shall include the following features:

26.14.8.1 Generator to be brushless, three-phase; either 208Y/120 or 480Y/277 volts.

26.14.8.2 Indoor wall-mounted contactor-type Automatic Transfer Switch complete with time-delays for engine start, transfer, retransfer, and cool-down; and an automatic exerciser clock. ATS shall have programmable timer. ATS shall be 4-pole, no smaller then 30A and must match the ampacity of the generator per code.

26.14.8.3 Automatic battery charger capable of recharging a completely discharged battery in 8 hours or less.

26.14.8.4 Critical exhaust silencer on top of the weather-protective enclosure.

26.14.8.5 Block heater and anti-freeze if engine is water-cooled.

26.14.8.6 Set to be assembled, tested, and warranted by the prime manufacturer of either the engine or the generator.

26.14.8.7 A generator remote annunciator panel shall be installed in the main office area preferably near the fire alarm panel.

26.14.9 Connect the following equipment/systems for operation from the Generator including emergency lighting in the rooms noted:

26.14.9.1 Exit signs, egress lighting, assembly areas and all spaces, devices and systems as explicitly required by the building codes.

26.14.9.2 Fire Alarm Systems and fire pump if one exists.

26.14.9.3 The Intercom Console

26.14.9.4 Area of Rescue Assistance/Two way elevator communication (if provided) enabling complete operation.

26.14.9.5 Group restrooms

26.14.9.6 Locker rooms

26.14.9.7 Health room

26.14.9.8 Teacher workroom/lounge

26.14.9.9 Main electrical room

26.14.9.10 Boiler room

26.14.9.11 Kitchen

26.14.9.12 Reception area

26.14.9.13 Classrooms where area of glazing/floor area < 8%

26.14.10 The number and arrangement of 480/277V panels, dry type transformers and 208/120V panels should be held to the minimum that practicality dictates.

26.15 RACEWAY SYSTEMS

26.15.1 Rigid Metal Conduit (RMC) or Intermediate Metal Conduit (IMC) shall be used indoors for all exposed feeders in normally occupied areas and outdoors for all feeders, above ground branch circuits and above ground low voltage/communications wiring.

26.15.2 Schedule 40 conduit Rigid Nonmetallic Conduit (RNMC) shall be used for outdoor underground branch circuits and outdoor low voltage wiring unless noted otherwise. Electrical service from the utility transformer to the main service equipment shall be concrete encased RNMC.

26.15.3 Flexible Metal Conduit shall be used for connections to mechanical equipment, transformers and light fixture whips. MC cable may be used for lighting whips. Use Liquid tight Flexible Metal Conduit for connections outdoors, in the kitchen and in other wet locations complete with Liquid tight connectors. Connectors shall be the insulated throat type, of steel or malleable iron.

26.15.4 Electrical Metallic Tubing (EMT) may be used indoors above grade only. It may be used in normally unoccupied spaces such as electrical rooms, mechanical rooms and similar areas.

26.15.4.1 EMT connectors and couplings to be the compression type, of zinc coated steel or malleable iron.

26.15.4.2 Provide EMT connectors with insulated throats.
ELECTRICAL

26.15.5 RNMC may be used in a concrete slab on grade and under a concrete slab.
26.15.6 RNMC runs that are required to stub up exposed shall utilize Rigid Metal Conduit elbows vertically.
26.15.7 RNMC runs that stub up in pad mounted equipment such as switchboards or transformers may utilize RNMC elbows vertically. Install termination fitting with a plastic bushing.
26.15.8 RNMC runs that turn up inside walls shall transition to EMT no greater than 60” above the slab or first junction box, whichever comes first.
26.15.9 Size raceways for signal and communication cables based on 40% fill. Use 3/4” as the minimum size conduit for Telephone, Data and CATV. Use 1” as the minimum size conduit for all conduit ran under slab.
26.15.10 Run raceways concealed in finished areas.
26.15.11 All exposed or concealed raceways to be run perpendicular or parallel to building walls and ceilings. All exposed raceway to be painted to match color of surrounding surfaces.
26.15.12 Nonmetallic surface mounted wire ways shall not be used in any installation.
26.15.13 The minimum size conduit shall be 3/4” for homeruns, and 5/8” for all other power circuit installations.
26.15.14 The minimum size junction box shall be 4” x 2 1/8” square. There shall be no more than one box extension.
26.15.15 Over-the-floor pancake raceways shall not be used. Run power to the center of the room in the floor or use power poles. Use Wire mold 25DTP-4 series tele-power poles (ivory) or equivalent. Make an effort to lay out furniture, computer workstations, etc. so that power and communication raceway can be run down walls and columns instead of having to use floor boxes and/or power poles.
26.15.16 Use surface metal raceways for new exposed work on existing surfaces in finished areas that would otherwise be free of exposed conduits and piping. Use Wire mold 4000 or V2400BD or equivalent.
26.15.17 Cable trays shall be provided in corridors. Use trays ONLY for distribution of low voltage signal and communication cabling. Cable tray and cable tray supports shall not be used for the support of any other raceways or MC cable (including no fire alarm MC cable.) At no time shall a cable tray go through a rated wall. Cable trays above suspended ceilings shall be the ladder type with 4” rails and 12” maximum rung spacing. Cables trays exposed in corridors shall be solid bottom type. All cable trays shall utilize “sweeping 90s”. Notify the Charlotte-Mecklenburg Schools Telecommunications Department when the cable tray system is complete for their review prior to the ceiling installation. Cable tray minimum width of 12” for elementary and middle schools and 18” for high schools. One divider will be provided in the trays that will separate the 12” trays into 8” for data/voice/catv and 4” for other trades and for 18” trays the division will be 12” and 6”. See specification 260536 for further requirements.
26.15.18 Raceways shall not be installed under canopies that are less than 12’ high. Raceways installed above canopies shall be installed a minimum of 8’ above the finished surface. Do not penetrate the finished surface of canopies.

26.16 PENETRATIONS, SLEEVES AND FIRESTOPPING

26.16.1 Provide wall sleeves and appropriate fire-stopping at passage of conduits and cables through rated walls. Provide and seal similar sleeves for passage of signal and communications cables through unrated walls unless other openings exist that can be utilized.
26.16.2 All penetrations, sleeves and fire stopping shall be fully described or detailed for each condition. Refer to the appropriate Through-Penetration Firestop Systems by their UL System numbers, and provide details on the drawings for each condition.

26.17 LIGHTNING AND SURGE PROTECTION

26.17.1 Surge/Lightning Protection shall be provided at the main service entrance equipment. A secondary level of protection shall be provided on all 120/208V power panels serving computer receptacles and/or convenience receptacles and low voltage systems. In rooms where multiple panels exist fed from the same source in that room, only one TVSS (SPD) is required connected to the distribution panel or the first section of a multiple section arrangement unless the subpanel has a substantial amount of computer or low voltage loads. A third level of protection shall be provided for power and data lines entering Fire Alarm Panels, Intercom Consoles, Telephone Head end Equipment, Security Camera Equipment and Media Retrieval Equipment. Provide surge protection on any lighting panel that feeds exterior lighting. Per NEC requirements, provide surge protection on all emergency panels. All protection shall be coordinated. Care must be taken to wire TVSS devices per the manufacture’s recommendations with regards to keeping wires as short as possible, no sharp bends etc. See specification 264313 “surge protection for low-voltage electrical power circuits”.
26.17.2 See “Charlotte-Mecklenburg Schools Lightning Protection Standard” for structural lightning protection requirements. Check requirements with CMS.
26.17.3 All existing lightning protection systems shall be maintained during building renovations and extended to any additions to the building.
26.18 LIGHTING – GENERAL INFORMATION

26.18.1 Lighting systems for new schools should be designed in accordance with Illuminating Engineering Society (IES) recommendations. This is 50fc for classrooms. The maintained target lighting level for all gyms should be 70-80fc for competition. Include consideration for possible sound attenuation baffles in the design. High schools should have dual level controls to provide 50fc for normal activities and secured controls to turn on additional lights for competition. Coordinate with CMS on location of the secured controls.

26.18.2 Lighting design shall incorporate the latest requirements of the NCECC energy code.

26.18.3 CMS prefers that general lighting in most areas be implemented with 2’x 4’ LED (light emitting diode) light fixtures. Lens should be of flat clear KSH12 type acrylic of 0.125” minimum, straight sided cones, 9.6 ounces per square foot, in rigid hinged steel or extruded aluminum door frames finished in baked white enamel and secured with inconspicuous spring-loaded or rotary cam type steel latches. Lenses shall be maintained in a flat position with invisible clips and shall be removable from the door frames using a screwdriver without damaging the lens or the frame. Diodes shall have a CCT of 4000K. Provide LED driver quick connect disconnecting means.

26.18.4 See specification 265119 “LED interior lighting” and 265619 “LED exterior lighting” for requirements.

26.18.5 All new area lighting shall be 277 volt where available.

26.18.6 Lighting shall be installed such that it can be easily maintained. 2’x 4’ fixtures should be able to be completely removed. Pay specific attention to stairwells where access may be difficult. Do not locate light fixtures over stairwells. Use wall mounted light fixtures in stairwells. Lights to be located above landings, not over stair steps.

26.18.7 Classrooms, tutor rooms and offices shall have double switching; bi-level drivers or dimming capability. Classroom lighting shall be controlled by (2) single pole switches at the room entry (bi-level control of all fixtures) and a single pole double throw switch at the teaching wall location to control the teaching wall fixtures on/off.

26.18.8 Lighting and outlets shall not be on the same circuit. Wiring for lighting and outlets shall be run in separate raceways.

26.18.9 Exterior building mounted lighting shall be LED and shall be controlled by photocell enable and astronomical time clock (ON/OFF). Light pollution is a common issue. Use cutoff type light fixtures unless specific requirements dictate otherwise. Do not direct light out and up for decorative purposes. The time clock will be the electronic type and retain its’ programming during loss of power. See specification 260923. Exterior lighting shall be installed at building entrances, exterior mechanical/electrical/storage room doors, loading docks, over the emergency generator, under canopies and around the building perimeter (wall-packs). Coordinate building mounted fixtures with parking lot and driveway lights so as to not duplicate lighting. Building mounted fixtures shall be vandal resistant. Normal setup should be on at dusk from photocell, off at 10:00 PM by timer, on at 5:00 AM by timer and off at dawn by photocell. Beginning and ending time setting should be wide enough to cover the change in seasons.

26.18.10 Parking lot lighting shall be part of the construction contract. LED basis of design. See specifications 265619 and 265613 for further information. Light pollution is an issue and a photometric study should be provided. Existing schools may have leased lighting as part of their original design; for those instances see the below items:

26.18.10.1 Verify with the CMS if the added site lighting shall be leased or provided as part of the contract documents.

26.18.10.2 Where verified to be leased, parking lot lighting shall be leased from the existing local electric utility. Poles shall match the existing design. The engineer shall be responsible for coordinating and obtaining the design from the respective utility. The Electrical Contractor shall provide all necessary sleeving under the parking lot to accommodate the underground wiring. Note that the respective utility may have specific requirements for this. The General Contractor shall be responsible for coordinating installation by the utility. The cost of the parking lot lighting materials and installation will be paid in one lump sum to Duke Power.

26.18.11 Energy Management Controlled Lighting

26.18.11.1 Provide lighting panel load side contactors tied to the Energy Management System (EMS) controlling all interior building lights except night lights or those controlled by occupancy sensors or those where a hazard would be created by turning them off. Normally these contactors would be scheduled On/Off by the EMS and would enable normal lighting control by the typical wall mounted light switches. These contactors should be the mechanically held type such that a normally open contact that was closed would retain its’ state even with an EMS system failure. These contactors require a signal to close and a separate signal to open. An auxiliary contact from each of the lighting contactors would be monitored by the EMS to assure that the contactors were actually in the state expected by the EMS.

26.18.11.2 In the front office area, adjacent to the security system keypad, there will be “Lighting Controls Over-ride” pushbutton(s) and a pre-setable timer(s) that will keep the lighting contactors closed for a period not to exceed 2 hours. The quantity of such over-rides will be a function of building layout. A layout drawing should be posted adjacent to the overrides indicating individual areas of control. When over-ridden, this will cause the contactors to be closed regardless of the state of the EMS. When the timer times out, the contactors will revert to control by the EMS schedule. Associated with this button will be an “Over-ride Off” function which will cancel the timer and immediately revert control to the EMS. Adjacent to these control device(s) will be an engraved label explaining the function of the device in detail in laymen’s terms.
ELECTRICAL

26.18.11.3 It is desired to minimize “Hand/Off/Auto” type functionality that would make it convenient to permanently bypass the automation system. Such functions should not be readily accessible and the state of this switch should be monitored by the EMS so that it can be annunciated that the system is bypassed.

26.18.11.4 Provide an interface from the building security system to the EMS such that when the security system is armed, the building would be assumed to be unoccupied and the lighting contactors would be opened regardless of the EMS schedule. When the security system is disarmed, control of the lighting contactors would revert to the EMS schedule. The “Over-ride” feature (2 above) would still take precedence over this. The intent is to satisfy the energy codes, actually save energy, provide fail-safe functionality in the event of EMS issues and allow easy extension of the availability of the building lights to support evening events like PTA meetings.

26.18.12 All control cabinets shall be located in electrical rooms. In no case should cabinets be mounted above ceiling.

26.18.13 Use LED high bay fixtures for gyms, multipurpose rooms, lobbies, or similar spaces. Fixtures in gyms shall have safety cables and guards to protect LED boards. The safety cables should be affixed to both the fixture and the wire guard.

26.18.14 High bay lighting shall be cord and plug connected.

26.18.15 Incandescent lamps shall not be used.

26.18.16 Use standard light fixtures when Standby Engine-Generator is available.

26.18.17 Provide emergency lighting in large rooms (classrooms, conference rooms, etc.) without windows. Provide emergency relays in classrooms to permit control of emergency lighting.

26.18.18 Battery type emergency lighting must be provided for paths to exit in facilities not provided with emergency lighting supplied through a Standby Engine-Generator. Use adjustable dual lamp-head equipment with maintenance-free batteries and built-in self-diagnostic features with audible battery alarms. In middle and high schools, those accessible to students should be of impact and tamper resistant design. Do not use emergency battery powered ballasts of any kind.

26.18.19 Use LED type exit signs with white plastic housing and red letters. Wall mount (flat) whenever possible. Provide battery back-up type exit signs with maintenance-free batteries and self-diagnostic features with audible battery alarms wherever the exit sign circuit is not supplied through a standby emergency generator.

26.18.20 Exit signs and emergency lights shall be high abuse, vandal resistant types.

26.18.21 Lighting, exit signs, clocks, etc., in gymnasiaums shall be protected by wire guards or protective lens.

26.18.22 Provide control relay in all gymnasiams and multipurpose rooms for emergency lights so that if the coil becomes de-energized during a power failure closing contacts in parallel with localized light switching for emergency circuit fixtures causing the fixtures to illuminate. This is particularly true for multipurpose rooms where always on emergency fixtures interfere with theatrical productions.

26.18.23 Lighting for each corridor shall be controlled from switches located in the office area or keyed switches located in the corridor.

26.18.24 Submit lighting calculations to CMS for review.

26.18.25 Do not locate drivers under ground or on the ground, i.e. bollards.

26.18.26 Do not use air-handling lay-in light fixtures.

26.18.27 Power to all AHU (air-handler unit) work lights must be included in work scope.

26.18.28 Athletic stadium field lighting shall utilize 1500W MH lamps. Stadium poles shall include maintenance cages and climbing pegs. Design football stadiums as IES class II venues. For football stadiums only, wiring from the top to the bottom of pole shall be hard wired, un-spliced and not contain “quick-wiring” or Molex type connectors. Assure that down cables from the lamps at the top of the pole to the control box are well supported so that there is no strain on the connections. Use terminal block connections at the top of these cables as pin type connections tend to pull loose. Verify with the project manager for the evaluation of general LED lighting. Provide emergency lighting on poles for stadium seating (high school football.) Where emergency lighting is required, lamping shall be LED tied back to the stadium generator. See specification 265668 “exterior athletic lighting” for more information.

26.18.29 See specifications 265561.01 (elementary) and 26561.02 (middle and K8).

26.19 LABELING

26.19.1 Label all receptacles, light switches and disconnect switches with feeder panel name and branch circuit number. Use dyo-type labeling. Black background with white letters for normal power. Red background with white letters for emergency power. Labels to be installed on the exterior front cover of disconnect switches and under cover plates of receptacles and switches.

26.19.2 Label all motor control centers, transformers, power, lighting and distribution panels with name, voltage, # phases, # wires and feeder information. Labels to be engraved laminated phenolic nameplates. Black background with white letters for normal power. Red background with white letters for emergency power.

26.19.2.1 For example: PP103A 120/208V, 3 Phase 4W, Fed from DP201C

26.19.2.2 In addition, each major piece of mechanical equipment and low voltage system will be labeled with the device name and source of power.
26.19.3 Use the following naming convention for electrical equipment:

26.19.3.1 PPXXXY for Power Panels
26.19.3.2 LPXXXY for Lighting Panels
26.19.3.3 DPXXXY for Distribution Panels
26.19.3.4 MDPXXXXY for Main Distribution Panels
26.19.3.5 TXXY for Transformers
26.19.3.6 TGHXXXY for Troughs

26.19.3.7 Where XXX = the architectural room/corridor designation number where the equipment is located or the nearest identifiable room number. If no architectural room/corridor designation number is available, use KIT, ELEC, MECH for equipment located in kitchens, electrical and mechanical rooms respectively. Y = A,B,C designation if multiple panels are located in the same room. For example, if one power panel was located in room 207, it would be designated PP207A. If two power panels were located in room 207, they would be designated PP207A and PP207B. If the equipment is fed from emergency power the above names should be preceded by an “E”.

26.19.4 A reduced size (17” X 22” minimum), but clearly readable, copy of the as-built riser diagram will be mounted to the wall adjacent to the main distribution panel (MDP) at the service entrance. It shall be laminated and rigidly mounted under Plexiglas or other means that protects it from damage or easy removal.

26.20 SPECIAL AREAS

26.20.1 FOOD SERVICE
26.20.1.1 The Food Service Area includes the Kitchen, Dishwashing, Food Storage, Serving, Dining and Satellite Serving Areas. The Child Nutrition Director for CMS is the primary contact person. Review all requirements with the CMS.
26.20.1.2 Provide suitable branch circuits, wiring, grounding, receptacles and connections for all Food Service equipment.
26.20.1.3 Whenever possible, locate receptacles in flush outlet boxes on walls.
26.20.1.4 Where exposed floor stub-ups are unavoidable, use vertical factory fabricated elbows consisting of galvanized heavy-wall rigid steel conduit with 40 MIL PVC coating. Do not use field bent elbows. Do not use flush floor boxes. Stub-ups to be of minimum height, to a waterproof cast box. Two conduits are required to each cast box; one for wiring the other for support.
26.20.1.5 Twist lock receptacles, flush in the ceiling, may be utilized for tall, freestanding appliances such as reach-in refrigerators and freezers, and proof cabinets.
26.20.1.6 The use of Satellite Serving Areas will require receptacles for food carts in the remote Serving Area, and also in the Kitchen.
26.20.1.7 Serving lines in the Serving Areas adjacent to the Kitchen are also mobile, requiring receptacles, cords and plugs.
26.20.1.8 Connect Fly Fans at exterior doors for automatic operation using door switches and relays or magnetic starters as required by the rating of the fan and door switch.
26.20.1.9 Use standard power for kitchen equipment. Do not connect circuits for Walk-in and Reach-in Refrigerators and Freezers to the Standby Engine-Generator System.
26.20.1.10 Provide panel board space and capacity for a future additional Walk-In freezer.
26.20.1.11 For outdoor condensing units, locate the disconnect switches within the fenced enclosures to avoid unauthorized shut-off.
26.20.1.12 Provide convenience outlets on each wall of Kitchen, Serving and Dining Areas for portable appliances and general purpose use.
26.20.1.13 Electrical outlet for the computer in the Cafeteria Manager’s Office shall be on a dedicated circuit.
26.20.1.14 Electrical outlet for the computer in each Cafeteria cash line (Point Of Sale/POS terminal) shall be on a dedicated circuit. Menu board outlet conduit shall be routed back to the cafeteria manager’s office (above ceiling).
26.20.1.15 Ansul systems will be provided for all cooking hoods (not dishwashing). Using control contacts furnished, provide the following operations upon actuation of the system.
26.20.1.16 Shunt trip all circuits connected to outlets or equipment under the hood.
26.20.1.17 All 120V 15 or 20A receptacles under the hood shall be protected by GFCI rated breakers. Do not supply with GFCI outlets.
26.20.1.18 Close the gas solenoid valve.
26.20.1.19 Actuate a separate zone on the Fire Alarm System, which in turn, will initiate fan shutdown sequences through the Energy Management System.
26.20.1.20 In Dry Storage Room, provide occupancy sensor.
26.20.1.21 Serving line equipment will include lighting built-in.
26.20.1.22 Food Service personnel will normally enter and leave via the Loading Dock and the exterior door to the Kitchen. Arrange light switches as follows:
26.20.1.22.1 Photo control for Loading Dock.
26.20.1.22.2 Light switches for Kitchen at exterior door to Kitchen.
26.20.1.22.3 Light switches for Serving Area in Kitchen adjacent to Serving Area.
26.20.1.22.4 Three-way light switches for Dining Room in Dining Room adjacent to Kitchen, and in Dining Room adjacent to Student’s entrance from Corridor.
26.20.1.23 Provide a doorbell in the Kitchen controlled by a push-button on the Loading Dock adjacent to the Kitchen door. Doorbell and push-button must be commercial grade.
26.20.1.24 Provide an Administrative Data outlet at each Cash Register. Provide 1” conduit with pull-cord from the Cash Register outlets to the Combination Tel/Data outlet in the Kitchen Office.
26.20.1.25 Provide hard wired CO detector with digital display in the kitchen area. See specification 283111 “digital, addressable fire-alarm system”.

26.20.2 MEDIA CENTER
26.20.2.1 Obtain Media Center requirements from CMS. Provide a duplex receptacle at both ends of the workroom table and a data drop at one end of the table. A wiring chase shall be provided by the architectural plans for data and power cabling.
26.20.2.2 Coordinate outlets with media center shelving to maintain 75’ maximum distance between each outlet.

26.20.3 KILN ROOM
26.20.3.1 Provide a 120V receptacle next to the kiln no more than 4 feet away from the kiln exhaust hood. Receptacle to be controlled by a 12 hour wind-up timer (without hold feature) and be used for kiln exhaust fan. Provide a heat detector in kiln room tied to fire alarm panel. Also provide power for thermostatically controlled kiln room exhaust fan (by mech. contractor). Provide a third outlet for the Skutt Kiln down draft exhaust system. Coordinate with Skutt manufacturer’s design criteria.
26.20.3.2 Kiln based on Skutt KM-1027 or equal. Breaker basis is 40A/3P at 208V 3 phase, with a NEMA 15-50R receptacle. For renovation projects review existing electrical service limitations with CMS.

26.20.4 SHOP AREAS
26.20.4.1 Power panels for shop areas to be have main breaker with shunt trip. Shunt trip to be activated by momentary Emergency Power Off buttons. E.P.O. buttons to be located at each room exit door. All shop power (except lights and teaching wall circuitry) shall be disconnected when E.P.O. is activated.
26.20.4.2 Verify the use of enclosed bus assemblies for shop areas with CMS.

26.20.5 ATHLETIC VENUES – SCOREBOARDS AND POWER
26.20.5.1 Provide scoreboards in all K8, Middle and High School Gymnasiums. All scoreboards shall be the LED and wireless type. K8 and Middle Schools shall have one scoreboard facing bleachers. High Schools shall have two scoreboards, one at either end of gymnasium on the end walls. Provide power for each scoreboard location with a keyed on/off switch directly below. Provide power for scorer’s location on the sideline of the court in a floor box.
26.20.5.2 Provide scoreboards for all Middle and High School football fields, baseball fields and softball fields. Provide power (w/disconnect) at each scoreboard location. Coordinate scoreboard location with the owner. In general, the scoreboards for baseball and softball shall be located behind left field. Scoreboards for football shall be located behind one end-zone opposite the main entrance to the field. Control wiring in conduit shall be provided to the scorer’s location. The scorer’s location shall be in the home-team dugout for baseball and softball. The scorer’s location for football shall be on the home-team sideline at the 50 yard line for Middle Schools and inside the press box for High Schools. All scorer’s locations shall be provided with suitable power to operate the scorer’s box. Coordinate scorer’s locations with the owner. Also provide power in the home-team dugout on High School baseball fields for a portable public address system. Provide power at K8 and HS soccer fields for portable scoreboard, locate at center of sideline on the home side.
26.20.5.3 Football Scoreboards HS: Electro-Mech Model #3260
26.20.5.4 Football Scoreboards MS: Electro-Mech Model #6650
26.20.5.5 Gymnasium HS: Electro-Mech Model #2665 (Master); Electro-Mech Model # (Slave)
26.20.5.6 Gymnasium MS: Electro-Mech Model #2350
26.20.5.7 Baseball/Softball HS: Electro-Mech Model #1530
26.20.5.8 Baseball/Softball MS: Electro-Mech #1060

26.21 MISCELLANEOUS

26.21.1 Typical Recommendation for Power and Communication Additions to Existing Schools.
26.21.1.1 365 EMT to panel
26.21.1.2 Data cables for power circuits for power circuits to cable tray
26.21.1.3 Data cables to cable tray 18” AFF or 6”
26.21.1.4 Data outlet above counter
26.21.1.5 Finished floor
26.21.1.6 Data outlet top backsplash.
26.21.1.7 Provide power for surface mounted electric hand driers.
26.21.1.8 Notes: 1) In the rooms with no lay-in ceiling extend the Wiremold to approximately 9’ above finished floor. Extend data cable conduit from this point to nearest accessible lay-in ceiling or data junction box where data cables can be pulled in. 2) No more than 6 duplex receps. per 20 A circuit. 3) Try to locate vertical portion of 4000 wire mold near corner of room. 4) If 18” height of 4000 Wire mold conflicts with existing room outlets, locate 6” above desks/benches.

26.21.2 Lamp Schedule
26.21.2.1 For reuse of existing fixtures coordinate re-lamping and ballasting with CMS.
26.21.3 School Sign
26.21.3.1 Provide power for school sign at front of school. Provide (2) 120V 20A circuits with a protective disconnect for LED sign. No telecom conduit required, sign uses cellular communication.
26.21.4 Backflow Preventer
26.21.4.1 Provide power for heater in backflow preventer. Verify each backflow (domestic, fire, irrigation, etc.) Provide tamper switches for the fire backflow as required in a separate conduit.
26.21.5 Student Group Restrooms
26.21.5.1 Provide power for hand dryers, dedicated circuit each with a lockable disconnecting means to perform service.
26.21.6 Provide 3/4” conduit with #18 AWG stranded pair wire from electric and gas company meter to EMS control cabinet. EC to coordinate final hook-up with Electric and Gas Company. See specification 262713 Electricity Metering.

26.22 COMMISSIONING

26.22.1 The commissioning process of CMS capital projects starts at design and continues through project close-out. The designer shall incorporate the following list of commissioning items within the specifications as applicable. It is intended for one or two days at each school to be dedicated to accomplishing/verifying the list below. A knowledgeable representative from the electrical and low voltage contractor must be present to verify. It shall be the contractor’s responsibility to set-up such a meeting prior to TCO.
INTRODUCTION
Division 27 is the low voltage portion of this Standard. It is intended to assist the communications designer in the preparation of drawings and specifications for the low voltage (data, voice, wireless and catv) systems to be included in school construction. It is not intended to serve as a code book or a construction specification. It also does not to relieve the communications distribution designer of his responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

The telecommunications designer shall have no less than three to five years of experience designing facilities of similar size and scope. The designer shall be hold a current BICSI RCDD (Registered Communications Distribution Designer) certification. The certificate shall be produced upon request.

Division 27 is compiled primarily to describe low voltage systems for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of electrical renovation. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E shall obtain from CMS the latest version of the Charlotte-Mecklenburg Schools Architects and Engineers Design Guide. The construction manager/general contractor can be provided the Charlotte-Mecklenburg Schools Architects and Engineers Design Guide as a reference only document.

REGULATORY REQUIREMENTS
The following latest editions of the industry standards are the basis for the structured cabling system described in this document. The standard listed shall be adhered to in the same manner as if they were the codes:

TIA/EIA
Article 492A , 526, 568, 569, 606, 607, 1152-A, 4966, TSB 162, 184-A, 190

BISCI
Telecommunications Distribution Methods Manual
Cabling Installation Manual
Customer-Owned Outside Plant Design Manual

NFPA
NFPA 70 National Electric Code (NEC)

27.1 TELECOMMUNICATIONS

27.1.1 SCHEMATIC DESIGN
27.1.1.1 Designer to work with Architect for location of telecommunications rooms.
27.1.1.2 All rooms must be located where no cable length, when installed, exceeds 295’. Designer to do calculations include horizontal AND vertical distances and required slack to determine whether locations of telecom rooms are correct to ensure all cables will be within standard requirements and testing requirements of the Category cabling to be installed.
27.1.1.3 Room sizes - Coordinate with Owner to ensure that the telecommunications minimum room sizes are incorporated into the Contract Documents.
27.1.1.4 MC/MDF (main telecommunications room) minimum acceptable size shall be no less than 14’x12’.
27.1.1.5 TR/IDF (intermediate telecommunications room) minimum acceptable sizes shall be no less than 12’x10’.
27.1.1.6 Room shapes are to be maximum 4 walls. Minimize any other architectural or structural obstructions so that the interior space of the telecommunications room can be dedicated completely to telecommunications equipment.

27.1.2 DESIGN DEVELOPMENT
27.1.2.1 Meet with Owner’s IT representative(s) prior to beginning design.
27.1.2.2 Design floor plans incorporating all the Owner’s standards and requirements.
27.1.2.3 Include the following on the Communications floor plans:
27.1.2.3.1 Data, voice, CATV, AV (audio visual) outlets with appropriate cable count designation, if necessary, and heights that differ from the symbol schedule(s). Communications outlets are to be provided by the electrical contractor and the cabling, terminations and faceplates are provided by the telecommunications contractor (T.C.)
27.1.2.3.2 Wireless access point locations
27.1.2.3.3 Power receptacles to be provided by the electrical contractor.
27.1.2.3.4 Sleeves, cable tray and conduits to be provided by the electrical contractor
27.1.2.3.5 Legend sheet
27.1.2.3.6 Riser diagram with data racks and/or enclosures being installed in each TR.
27.1.2.3.7 Enlarged TRs showing racks/enclosures, power receptacles, sleeves, conduit and ladder racking. Also show ground bus bars that will be provided by the E.C. (electrical contractor).

27.1.2.4 Coordinate with Architect, Electrical and Mechanical Engineers to ensure all spaces designed by other disciplines are coordinated with the Communications drawings.

27.1.2.5 Review completed Design Development submittal with the Owner’s IT representative(s).

27.1.3 CONSTRUCTION DOCUMENTS

27.1.3.1 Complete floor plan designs incorporating all Owner’s comments, updated architectural and electrical backgrounds.

27.1.3.2 Complete the riser diagram.

27.1.3.3 Show all rack mounted equipment provided by the T.C. (Patch panels amounts shown on the drawings shall match the actual drop counts per TRs.)

27.1.3.4 Backbone cables and their types running between the TRs.

27.1.3.5 Lightning protection if applicable.

27.1.3.6 Enlarged drawing for ladder racking to be installed in the TRs.

27.1.3.7 Enlarged drawing for telecommunication room equipment placement.

27.1.3.8 Prepare specifications documents.

27.1.3.9 Designer will obtain the Owner’s master specifications. The Designer is responsible for altering these specifications for job-specific purposes.

27.1.3.10 Review drawings and specifications with Owner’s IT representative(s) prior to Construction Document submittal. Incorporate Owner’s comments from previous phase into this submittal.

27.1.4 CONSTRUCTION ADMINISTRATION REQUIREMENTS

27.1.4.1 Review and comment on submitted bids by T.C.s.

27.1.4.2 Review and comment on submittals.

27.1.4.3 Perform site visits at regular intervals during construction to ensure the project is being built according to the Construction Documents.

27.1.5 DESIGN STANDARDS

27.1.5.1 Telecommunications Rooms

27.1.5.2 The MC/MDF contains the telephone switch, CATV distribution headend and network electronics.

27.1.5.3 The security head-end may also be in the MC.

27.1.5.4 This will be the entrance facility for the service providers.

27.1.5.5 The Intermediate Communications Cross-Connect (TR) are telecommunication rooms fed from the MC. They will house cross-connect equipment as well as network electronics.

27.1.5.6 Minimum dimensions:

27.1.5.6.1 MC 14’ x 12’

27.1.5.6.2 TR 12’ x 10’

27.1.5.7 Telecommunications Rooms shall be centrally located on each floor to serve as a junction point for communications cabling.

27.1.5.8 The MC-Main Telecommunications Room shall be centrally located on grade level.

27.1.5.9 All cabling shall be served from a telecommunications room located on the same floor.

27.1.5.10 In multistory structures, the telecommunications rooms shall be in line vertically, located directly above and below one another.

27.1.5.11 Telecommunications Rooms must be located to ensure that the length of the Category cables will not exceed the maximum length of an individual Category 6 data cable of 295 feet. This includes vertical distance going up and down the walls and service slack.

27.1.5.12 All Telecommunications rooms shall not have lay-in ceilings and shall be conditioned (no heat).

27.1.5.13 Conditioning shall take into consideration the heat emissions from installed equipment in each room.

27.1.5.14 Entranceways to telecommunications rooms shall be a minimum of 36 inches wide and 80 inches high without a doorsill, and shall be fitted with a lock.

27.1.5.15 It is preferred that the door swing out.

27.1.5.16 Lighting shall be provided in all telecommunications rooms to illuminate to 50 foot candles at 3 feet above finished floor.

27.1.5.17 Portable fire extinguishers shall be provided in each telecommunications room per applicable codes.

27.1.5.18 If the building is sprinkled, the sprinkler heads in each telecommunications room shall be provided with wire cages to prevent accidental operation.

27.1.5.19 The wall finish in telecommunications rooms shall be light in color to enhance room lighting. Painted walls shall not have hues or shades of gray.
27.1.5.20 Rooms that contain power distribution equipment (power panels, transformers, etc.) or running water (sinks, showers, etc.) shall not be considered for telecommunications rooms.

27.1.5.21 Rooms that may be subject to water damage in general shall not be considered for Telecommunications Rooms.

27.1.5.22 Water piping shall not be run above or through the MC or any TR.

27.1.5.23 Electrical conduit or electrical feeders shall not run above or through the MC or any TR.

27.1.5.24 Mechanical Ductwork or piping shall not run above or through the MC or any TR.

27.1.6 WALL SLEEVES FOR TELCOM ROOMS

27.1.6.1 In the MC/MDF provide a minimum of (7) 4” conduit sleeves in wall for cabling pathway and support into the room.

27.1.6.2 For the IDF/TRs provide a minimum of (5) 4” conduit sleeves in wall for cabling pathway and support into the room.

27.1.6.3 Add (1) 4” sleeve if the main security system headend is located in TR.

27.1.6.4 Provide (4) 4” conduit sleeves between floors to provide pathways feeding different levels.

27.1.6.5 Designer to perform conduit sleeve calculations to determine if more sleeves are necessary. One sleeve in each room shall be for future use.

27.1.7 POWER REQUIREMENTS FOR TELCOM ROOMS

27.1.7.1 MC/MDF

27.1.7.2 Provide one (1) dedicated quad receptacle at 80” AFF for each data rack installed.

27.1.7.3 Provide one (1) or two (2) L5-30R at 80” behind rack one and rack two. (Coordinate with Owner’s IT Department to determine how many UPS will be provided.)

27.1.7.4 Provide quad receptacles at 18” on each wall.

27.1.7.5 Provide 24” ground bus bar at 80” near the service entrance conduits.

27.1.8 IDF/TR

27.1.8.1 Rooms shall be provided with one (1) dedicated quad receptacle at 80” AFF for each data rack installed.

27.1.8.2 Install one (1) or two (2) L5-30R at 80” behind rack one and rack two. (Coordinate with Owner’s IT Department to determine how many UPS will be provided.)

27.1.8.3 Provide quad receptacles at 18” on each wall.

27.1.8.4 Provide 12” ground bus bar at 80” on the wall behind the racks.

27.1.9 LADDER RACKS

27.1.9.1 Racks and accessories shall be provided and installed by the Telecommunications Contractor. Racks and accessories shall be assembled in accordance with the manufacturer’s instructions.

27.1.9.2 Ladder racking shall be installed at 8’-6” AFF (above finished floor) wall mounted to route cables from the point where they enter the rooms to the rear of the racks. Wide sweeping turns are required for all ladder racks and cable trays. Backbone cables, voice cables and data cables shall be neatly grouped in separate bundles before they enter the room then neatly routed to the rack. Use Velcro straps to bundle cabling.

27.1.10 SERVICE PROVIDERS ENTRANCE REQUIREMENTS IN MC/MDF

27.1.10.1 Provide two (2) 4” conduits and one (1) 2” conduit from the property line to the MC/MDF.

27.1.10.2 Coordinate with Service Providers for the exact location of the conduit end-points at the property line.

27.1.10.3 Conduits shall be rigid metal or rigid non-metallic, installed in accordance with Articles 345, 346 or 347, respectively, of the NEC, and ANSI/TIA/EIA-569-B.

27.1.10.4 Use rigid metal conduit elbows when turning up inside the building and when turning up at the service pedestal or poles located at the property line.

27.1.10.5 Turn up a minimum of 3’ at the property line.

27.1.10.6 Conduits entering the MC/MDF shall be located at the left side of the backboard, extending 12” to 18” AFF and placed tightly against the wall.

27.1.10.7 Conduits shall be buried to a minimum depth of 36” below final grade (EIA/TIA 569-B).

27.1.10.8 Warning tape (detectable) shall be placed at a minimum of 18” above the underground conduit.

27.1.10.9 Provide 30” x 48” x 24” with open bottom pull box at the pole location for conduits transitioning from pole/pedestal to underground routing.

27.1.10.10 Provide additional pull boxes at 150’ on center, then provide additional hand holes as required by the service providers.

27.1.10.11 Conduits shall have no more than the equivalent of 180 degrees of conduit bends or contain a reverse bend (U shape). If there is a reverse bend, install pull box for a pull point.

27.1.10.12 All conduit bends shall have a minimum radius of ten times the inside diameter of the conduit. LBs are not permitted.

27.1.10.13 A nylon pull line, rated 200 pounds, shall be installed in each of the entrance conduits.
Cap the conduit ends at the property line to prevent debris, water, and gases from entering the conduits and building before cable installation.

Use a rubber cap with stainless steel clamps.

The responsibility to seal entrance conduits to protect against water damage is left entirely with the Telecommunications Contractor.

The conduits’ sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.

Stake the end of the conduits with an orange marker to aid in location by the local telephone and cable TV companies.

Indicate location on drawings.

All fire rated structures, walls, floors, ceilings, that are penetrated during conduit placement must be fire-stopped to re-establish the integrity of fire-rated architectural structures and assemblies to appropriate building codes.

In order to assure timely service to new construction sites, coordinate a site meeting with the service providers, E.C and T.C. to review the service provider’s requirements early in construction.

**TELECOMMUNICATIONS ROOM EQUIPMENT**

7'H x 19"W floor mounted racks shall be installed in the telecom rooms.

Keep a 42” clearance from back of rack to the wall behind the racks.

Leave 36” clearance to one side of the row of racks as well as 36” clearance to the front of the racks.

Provide a dual layer of ladder racking.

18” ladder rack shall be installed at 8’-6” in the telecom rooms.

12” ladder rack shall be installed at 7’-6” in the telecom rooms.

Network equipment provided by Owner will be installed in the floor mounted racks.

Contractor provided patch panels, wire management, grounding equipment and surged power strips are required.

Install A/C ½” fire-rated plywood on walls.

MC/MDF will receive plywood on all walls.

TR/IDFs will receive plywood on complete wall behind the racks and additional walls from the sleeves entering the room to the wall behind the racks.

MC/MDF will house the security alarm panel.

A data outlet will be provided at this location.

MC/MDF will house the Helios front door controls.

A data outlet will be provided at this location.

Occasionally the Intercom Contractor will install pop-it cans in the telecom rooms.

These pop-it cans must not be installed on the wall behind the racks. And the location must be coordinated with the Designer.

Owner provided network electronics will be installed in the racks by Owner in the telecom rooms.

Owner provided UPS equipment will be installed in the racks by Owner in the telecom rooms.

Security head-end equipment will typically be installed in the MC/MDF, and at times a TR/IDF.

This equipment is to be installed in a dedicated 7’ floor mounted data rack.

Security patch panels for IP security devices are installed in the telecom rooms.

These patch panels are to be installed at the bottom of the data rack to keep a separation between the contractors.

The T.C. provides one modular patch panel in each telecom room for the Security Contractor’s use.

The Security Contractor shall provide any additional needed patch panels needed for IP Security.

Wire management, both vertical and horizontal are to be installed in each telecom rack.

For MC/MDF, See Appendixes 1, 2 and 3.

For TR/IDF, See Appendixes 4, 5 & 6.

**TELECOMMUNICATION OUTLET REQUIREMENTS**

A telecommunication outlet is defined as a 3/4” conduit terminating in a 4” square, extra deep outlet box, with a single gang mud ring.

The electrical contractor shall provide all outlets.

Each telecom outlet may be used for data cabling, voice cabling, catv cabling or a combination of each.

Each telecom outlet shall be located next to an associated electrical quad power receptacle.

Telcom contractor to provide faceplates and labeling.

**CABLING REQUIREMENTS**

Horizontal Data, Voice and Wireless Cabling

Voice and data cable shall be blue jacket, Category 6 four pair, UTP (Unshielded Twisted Pair) cable.

Wireless cable shall be yellow jacket, Category 6 four pair, UTP cable.

CATV cabling shall be accomplished with series 6 or series 11 coaxial cables.
Horizontal data/voice cabling is installed in a star topology (homerun) method.

Bridged taps and splices are not permitted as part of the copper horizontal cabling.

Coaxial cabling head-end distribution area will be the Main Telcom Room (MC), and extend to the outlets via Series 6 or Series 11 coaxial cabling utilizing Contractor provided Amplifiers, Directional Couplers, Equalizers and Attenuators.

All cabling will be installed adhering to the latest BICSI and TIA guidelines as well as manufacturer’s best recommendations.

All cabling will be installed adhering to the NEC and to the satisfaction of the Authority Having Jurisdiction.

Terminations shall be to the T568B standard.

Terminations shall be on RJ45 jacks.

Jack color coding requirements are blue for data, green for voice, yellow for wireless, white for security IP.

All cabling in the ceiling cavities shall be plenum rated.

Cabling routing under slab or underground or on top or under canopies between buildings shall be rated as Outside Plant.

Suspended cable runs shall be supported every 5 feet or less and have a minimum 3 inch vertical clearance from the ceiling grid and tile.

Under no circumstances shall cable of any type, including fiber optic and inner duct, be laid on the ceiling grid or be supported from ceiling or light fixture hanger wires. (NEC 300-11, BICSI Standards-latest editions).

Cables shall not lie directly on light fixtures, electrical machinery, or air return ducts in the hung ceiling. Cables shall be installed at a minimum of 12 inches away from EMI inducing equipment.

Horizontal cables shall terminate to the closest TR/IDF or MC/MDF on the same floor. Copper cabling shall not terminate on different floors other than Backbone Voice Cables and Coaxial Cables.

Horizontal cable links shall not exceed 295’.

All copper and fiber optic cable bend radii shall be maintained per manufacturer and industry standards.

Do not exceed the cable pulling force and minimum cable bending radius.

Cable slack required

Data room

20 feet minimum for UTP

20 feet minimum for Fiber, not including the 15 feet of workable fiber wound inside fiber cabinet.

Work area outlets

12 inch minimum for UTP

Access point locations

20 feet minimum for UTP

Backbone Cabling

All cabling shall originate at the MC/MDF and route to TR/IDFs feeding different areas of the campus.

Data circuit

50 Micron OM3 twelve strand fiber shall be provided to each TR and terminate with ST connectors within fiber enclosures.

Voice circuit

Voice backbone shall be Category 3 twenty-five pair routing from the MC to each TR. It will terminate on modular patch panels with RJ 45 jacks. Terminate 2 pairs per port, and roll back the 25th pair.

Cabling will be installed in adherence to the requirements of the latest BICSI and TIA standards as well as to the current NEC and acceptable to the Authority Having Jurisdiction.

Video circuit

Video signal backbone cabling will be typically Series 11 coaxial cable. However, it can at times be accomplished with Series 6 coaxial cabling. The Designer shall do attenuation calculations to determine the proper coaxial cable to be used for backbone cabling.

Where backbone cables and distribution cables are installed in a cable tray or wire way, backbone cables shall be bundled separately from the horizontal distribution cables.

All backbone cables shall be securely fastened to the sidewall of the Telecommunications Rooms on each floor with metallic D-Rings on the fire-rated plywood behind the data racks.

Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.

Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.

Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.
27.1.13.24.10 All backbone cabling will be installed per the latest editions of industry standards, BICSI and TIA (Telecommunication Industries Association) also in a method acceptable to the Authority Having Jurisdiction and per the NEC.

27.1.13.24.11 Proper supports to structure are required.

27.1.14 PATHWAYS

27.1.14.1 Cable trays

27.1.14.1.1 In corridors and other designated locations, open cable tray is to be installed as raceway for low voltage cabling above accessible ceilings. In the case of hard or open ceiling areas, a closed-top cable tray is to be provided.

27.1.14.1.2 Cable tray to be sized as follows:

27.1.14.1.2.1 18-inch ladder type cable tray supported either wall mounted or trapeze supports via Unistrut.

27.1.14.1.2.2 Provide one divider in the tray; 12” section for data, voice, video and 6” section for intercom, IP security, intrusion.

27.1.14.1.3 Cable tray clearance requirements:

27.1.14.1.3.1 12” of clearance above the tray, and 36” clearance from one side of the tray to protect access to the trays.

27.1.14.1.3.2 Water piping is not allowed to route above the tray. If this is unavoidable due to the constraints of the ceiling space, a drip pan with installed drains must be installed under the piping in order to protect the cables from water damage.

27.1.14.1.3.3 This requirement will not be required where there are no joints in branch piping less than 2” in diameter that do not have any joints in the pipes 2’ from the top of the cable tray dimensioning from each side of the tray.

27.1.14.1.3.4 Electrical conductors are not allowed to be routed in the tray or supported by the tray, nor be routed parallel within 12” of the tray to protect the cables from EMI.

27.1.14.1.3.5 Mechanical controls cables shall not be installed in the cable tray, nor be supported by the cable tray or the cable tray supports.

27.1.14.1.3.6 Duct work and mechanical piping shall not obstruct the tray and must leave the tray accessible through out its routing.

27.1.14.1.3.7 Cable tray shall be provided at telecom rooms to provide a continuous pathway to the sleeves entering telecom rooms.

27.1.14.2 Conduit pathways

27.1.14.2.1 The size of conduit required will depend on the number of cables to be routed through the conduit. A maximum 40% fill ratio is required for all conduit.

27.1.14.2.2 Minimum size conduit is 1”. (Minimum size for a conduit stub up for an outlet is ¾”.)

27.1.14.2.3 Flexible conduit for data/voice cabling is only permitted at power pole locations and in some cases in casework.

27.1.14.2.4 Conduit for low voltage cabling shall be run overhead and not under slab whenever possible.

27.1.14.2.5 When running under slab, the conduits shall be extended to the nearest data closet.

27.1.14.2.6 All conduits shall have no continuous sections longer than 100 feet without a j-box.

27.1.14.2.7 All conduits shall not have two 90 degrees or a reverse bend (U shape) between pull points without a pull box.

27.1.14.2.8 Pull boxes shall be labeled on the exposed exterior side, per TIA-606A. Labeling shall be easily visible.

27.1.14.3 Conduit sleeves

27.1.14.3.1 Designer to review with the Architect areas and space where the walls rise to the deck of the floor or roof above.

27.1.14.3.2 Sleeves shall be EMT; quantity and sizing below:

27.1.14.3.2.1 Instructional Classrooms (3) 2” Conduit Sleeves

27.1.14.3.2.2 Resource Classrooms (3) 2” Conduit Sleeves

27.1.14.3.2.3 Flex Classrooms (3) 2” Conduit Sleeves

27.1.14.3.2.4 Computer Lab Classrooms (2) 3” Conduit Sleeves

27.1.14.3.2.5 CTE Computer Lab Classrooms (2) 3” Conduit Sleeves

27.1.14.3.2.6 Tutor Rooms (2) 1” Conduit Sleeves

27.1.14.3.2.7 One/Two Person Offices (2) 1” Conduit Sleeves

27.1.14.3.2.8 Conference Rooms (2) 1” Conduit Sleeves

27.1.14.3.2.9 Prep Rooms (2) 1” Conduit Sleeves

27.1.14.3.2.10 Science Classrooms (3) 2” Conduit Sleeves

27.1.14.3.2.11 Maker Space (size and quantity to be determined on project by project basis)

27.1.14.3.2.12 Media Center (size and quantity to be determined on project by project basis)

27.1.14.3.2.13 Cable Tray Breaks (4) 4” Conduit Sleeves

27.1.14.3.2.14 Telecom Rooms to be determined per individual room

27.1.14.4 Aerial cabling

27.1.14.4.1 When aerial cable is being considered as an option the following must be addressed:

27.1.14.4.1.1 The minimum height/clearances

27.1.14.4.1.2 Loading

27.1.14.4.1.3 Distance between support structures

27.1.14.4.1.4 Distance from power conductors
27.1.14.4.1.5 Grounding of messenger/suspension strand and guy wires
27.1.14.5 Non-continuous hangers and supports
27.1.14.5.1 Provide non-continuous hangers and supports for cabling not supported by cable tray or conduits.
27.1.14.5.2 Cabling will be supported by hangers and supports within 6” of exiting conduits.
27.1.14.5.3 Hangers and supports installed above accessible ceilings shall be plenum-rated.
27.1.14.5.4 Installation of hangers and supports shall abide by current industry standards and manufacturer recommendations.
27.1.14.5.5 Maximum fill ratio shall not exceed 40% and shall not exceed manufacturer’s allowable fill capacity for each hanger or support.
27.1.14.5.6 All hangers and supports shall be secured to structure and must be also be secured at the bottom.
27.1.14.5.7 If tying to existing ceiling grid, these support wires must be tagged or painted and must be easily distinguishable from the ceiling grid support wires.
27.1.14.5.8 Provide cabling supports 4’-5’ on center, but stagger the lengths between the required 4’-5’ requirement.
27.1.14.5.9 Install supports where cabling routes parallel and perpendicular to building lines.
27.1.14.5.10 Groom cables within supports with tie-wraps or other acceptable methods.
27.1.14.5.11 Cable sag is limited to 12” between supports.
27.1.14.5.12 A 3” minimum clearance is required between the cable support system and the ceiling tie support grid.
27.1.14.5.13 For Category 6 UTP four pair cables, no more than 40 cables shall be bundled together or supported with a single hanger.

27.1.15 LIGHTNING PROTECTION
27.1.15.1 Provide over voltage protection on both ends of cabling exposed to lightning or accidental contact with power conductors.
27.1.15.2 For UTP cable, solid state modules are required.
27.1.15.3 For coaxial cabling, provide lightning blocks at the service provider entrance and all other areas that could be exposed to lightning damage.
27.1.15.4 Typically lightning protection will be installed in the telecom rooms.
27.1.15.5 At times it may need to be installed in ceiling cavities for transition purposes as well. In these situations, install in a NEMA (National Electrical Manufacturers Association) and NEC approved junction box and ground according to best practices and per NEC requirements.

27.1.16 GROUNDING
27.1.16.1 In telecom rooms the E.C. will provide grounding bus bars.
27.1.16.2 Bus bar sizes
27.1.16.2.1 MC/MDF-24” pre-drilled bus bars
27.1.16.2.2 TR/IDF-12” pre-drilled bus bars
27.1.16.3 All bus bars are to be installed with insulation standoff brackets
27.1.16.4 Bus bars to be bonded to building ground by the Electrical Contractor.
27.1.16.5 Two bonding conductors are required for each bus bar.
27.1.16.6 One bonding conductor will be installed to building steel.
27.1.16.7 One bonding conductor will be installed and terminated at the nearest power panel.
27.1.16.8 Provide two-hole long barrel irreversible grounding lugs with ¼” bolt holes spaced on 5/8” centers.
27.1.16.9 Straps shall be a minimum 11” in length.
27.1.16.10 Each data rack or cabinet will have a horizontal ground bus bar installed at the top of the rack.
27.1.16.11 Provide one (1) 6 AWG bonding conductor to the telecom room ground bus bar to bond each rack.
27.1.16.12 Each section of ladder rack must be bonded, as well as each sheath of shielded or armored cable. Metallic housings, messenger cables and metallic raceways will also be bonded to ground.
27.1.16.13 Size bonding conductors to NEC requirements.

27.1.17 FIRE STOPPING
27.1.17.1 All penetrations through fire-rated building structures (partitions and floors) shall be sealed with an appropriate firestop system.
27.1.17.2 This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure).
27.1.17.3 Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways that are specifically designated for the data/voice/catv infrastructure shall be properly fire stopped.
27.1.17.4 The contracting discipline installing the sleeve or slot shall be responsible for sealing the area on the exterior of the sleeve or slot.
27.1.17.5 The T.C. is responsible for fire stopping the interior annular area.
27.1.17.6  Firestop systems utilized shall be dictated by this project’s Professional Electrical Engineer’s selected UL (Underwriters Laboratory) design.

27.1.17.7  If a Professional Engineer’s selected UL design is not available, the T.C. shall provide appropriate UL design for penetrations through rated walls and properly firestop penetrations. These documents shall be submitted to the Designer.

WORK AREA OUTLETs
27.1.18  Telcom outlets will be provided by E.C.
27.1.18.1  Cabling provided by T.C.
27.1.18.2  Refer to Appendix 7 for cabling required in various spaces.
27.1.18.3  Refer to Appendixes 8 - 17 for example designs of classrooms, offices, media centers, etc.
27.1.18.4  Provide horizontal cabling to outlets from zoned telecom rooms.
27.1.18.5  Terminate cables according to this document.
27.1.18.6  The cable jacket shall be maintained as close as possible to the termination point.
27.1.18.7  Pair untwist at the termination shall not exceed ½”.
27.1.18.8  Observe and follow industry standard bend radius requirements.
27.1.18.9  Provide single-gang faceplates in the vertical position.
27.1.18.10  Provide blank modules on unused positions within the faceplate.
27.1.18.11  Adhere to color codes and color of equipment as stated in Sections 270200, 270510.
27.1.18.12  E.C. shall provide stainless steel blank cover plates for all unused telcom outlets.

WIRELESS ACCESS POINTs
27.1.19  Each wireless access point will receive one (1) yellow jacketed 4 pair Category 6 UTP cable.
27.1.19.1  Termination will be accomplished by terminating the cable in the ceiling cavity with a RJ45 jack or plug.
27.1.19.2  20’ of slack at the wireless access point location is required.
27.1.19.3  Coil and secure slack to building structure.
27.1.19.4  Label the ceiling grid below the termination per Section 270200.
27.1.19.5  Terminate the wireless access point cables in modular patch panels designed for ‘Wireless’ within the zoned telecom room.
27.1.19.6  In areas where ceilings height is greater than 15’ or in areas with no accessible ceiling or open ceilings, wireless access point cable will be terminated in wall recessed outlets.
27.1.19.7  In these areas, typically, a wall mounted directional antenna, provided by Owner, will be installed.
27.1.19.8  T.C. to install Owner provided wireless access points and directional antennas.
27.1.19.9  Provide pre-manufactured protection wire cages for any and all wireless access points or directional antennas subject to damage. Install per manufacturers requirements for the type of structure being installed upon.

TIMECLOCKs (KRONOS)
27.1.20  Two (2) timeclocks are to be provided in each school facility.
27.1.20.1  One timeclock will be located in the kitchen area near the door to the exterior of the building.
27.1.20.2  One timeclock will be installed in the administration area’s workroom.
27.1.20.3  Timeclocks will be provided and installed by Owner.
27.1.20.4  T.C. to provide one Category 6 4 pair UTP cable to timeclock locations.
27.1.20.5  Terminate on RJ45 jacks in 54” AFF telecom outlet

EXTERNAL BELLS-STINGER RINGERS
27.1.21  External bells are to be installed in a school facility.
27.1.21.1  Two external bells are required in Pre-K-Middle School facilities.
27.1.21.2  One will be located outside of the cafeteria manager’s office and will be used to tie to cafeteria manager’s desk phone.
27.1.21.3  This outlet will be installed at 90” AFF.
27.1.21.4  Another external bell or stinger ringer is required for the after school exceptional program (ASEP).
27.1.21.5  This location will have to be coordinated during construction.
27.1.21.6  Designer to add a note to floor plans stating T.C. to provide surface mounted raceway and outlet. Location to be coordinated on site with Owner.
27.1.21.7  This external bell is only installed in Pre-K to Middle School facilities.
27.1.21.8  Each external bell/stinger ringer will be provided T.C.
27.1.21.9  Provide one Category 6 4 pair UTP, blue jacketed cable to each external bell routing from zoned TR.
COMMUNICATIONS

27.1.22 **IDENTIFICATION AND LABELING**
27.1.22.1 All cables, faceplates, patch panels, ports, grounding conductors and junction boxes shall be labeled with self-adhesive, machine printed labels.
27.1.22.2 Cables shall be labeled on each end, typically 6” from termination. Cable labels shall be easily observed and not obstructed in cable bundles at the telcom room.
27.1.22.3 Labeling shall abide by the Sections 270200 and 270510.

27.1.23 **CABLE TESTING**
27.1.23.1 All cables, both horizontal and backbone as well as termination hardware shall be 100% tested for defects to verify the cabling system performance adhering to the testing requirements of TIA 568 and TIA 526 and testing requirements as stated in Sections 270200 and 270510.

27.1.24 **CLEAN UP**
27.1.24.1 Contractor shall keep all work areas clean and dust free.
27.1.24.2 Daily clean up shall occur to include sweeping, vacuuming, picking up equipment and other activities to keep the work area clean and hazard free.

27.1.25 **SYSTEM DOCUMENTATION AND CLOSE OUT**
27.1.25.1 T.C. shall provide all required electronic and hard copied record documents as detailed in Section 270100.
27.1.25.2 Test results, patch panel logs, tester calibration sheets, laminated as-buifts, as-built dwg files, as-built REVIT files shall be submitted to the Owner within 30 days of project completion.

27.2 **AUDIO**
27.2.1 Sound system diagrams. [See Appendix 27.2.1]
INTRODUCTION
Division 28 represents security systems and the fire alarm of this Standard. It is intended to assist a qualified Electrical Engineer, Architect and Civil Engineer in their preparation of drawings and specifications for the security system. The Electrical Engineer has the primary responsibility of designing the systems through collaboration with the Architect, Civil Engineer, and Owner. The incorporation of CPTED – crime prevention through environmental design principals is a requirement of the overall design outcome. This information is not intended to serve as a code book or a construction specification. It also does not relieve the Engineers and Architect of their responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 28 is compiled primarily to describe the security systems for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of security system renovations. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

28.1 SECURITY SYSTEMS

28.1.1 Contact CMS for system requirements, scope and equipment.
28.1.2 All Charlotte-Mecklenburg School facilities are protected by an electronic Burglar Alarm System during periods of non-occupancy. Each construction project is required to include the equipment, devices and wiring necessary for the system. See specification 281600 – Intrusion Detection.
28.1.3 CCTV surveillance will be implemented at Charlotte-Mecklenburg High Schools. Contact Project Manager for complete scope of work concerning CCTV. Camera locations shall be determined on a school by school basis. In general, cameras shall be provided at main gathering areas on the interior (hallways, cafeterias, doors of entry, auditoriums, gymnasiums, etc.) and exterior (parking lots, etc.). See “Charlotte-Mecklenburg Schools Video Surveillance System (VSS) Standard” specification 282300 – IP based video surveillance system.
28.1.4 Helios system - Provide pathway and back box to support owner provided system at front entry.
28.1.5 Door Access Control See Appendix 28.1.5

28.2 FIRE ALARM SYSTEM

28.2.1 Contact CMS for complete Fire Alarm System scope of work on renovation or addition projects.
28.2.2 Provide heat detectors in custodial spaces greater than 100 sq. ft., in laundry rooms in proximity to the dryer, kiln and main mechanical rooms.
28.2.3 All fire alarm wiring must be in conduit or utilize MC fire alarm/control cable.
28.2.4 Only provide fire alarm in exterior buildings (remote from the main school building) required by code (such as field houses). If not required in these exterior buildings, do not provide fire alarm annunciation. Coordinate with the fire marshal for required fire alarm activation as it relates to zoning with the main building and how that alerts each zone.
28.2.5 Provide an allowance for first responder Bi Directional amplifier (800 MHz) if directed by CMS. Determination of installation of system shall be evaluated at the end of the project when tested with first responder radio systems. Allowance based on $70,000.00.

28.3 VIDEO SURVEILLANCE SYSTEM (VSS) STANDARD

28.3.1 See specification 282300 - IP based video surveillance system, and 282310 - Video surveillance cabling. Designer shall provide a full camera schedule matrix including cabling, mounting, height, cabling zone and type on the plans for CMS to review.
28.3.2 PTZ cameras shall not be used for new projects. They shall be evaluated by CMS in existing schools where they are managed. Fisheye type cameras shall not be used.
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INTRODUCTION
Division 31 and 32 represents the earthwork, exterior improvements, physical education and exterior athletic competition features of this Standard. It is intended to assist a qualified Civil Engineer and or Landscape Architect in their preparation of drawings and specifications. The designer of record is to have a thorough knowledge of how K-12 environments operate on a day to day and annual perspective. Experience in land development design practices are essential of civil engineer and landscape architect. This information is not intended to serve as a code book or a construction specification. It also does not relieve the Civil Engineer of their responsibility for adequate design and coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 31 and 32 is compiled primarily to describe the earthwork, exterior improvements, physical education and exterior athletic competition features for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of renovations. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

31. EARTHWORK

31.1 EXISTING CONDITIONS
31.1.1 Preserve existing landscape and natural vegetation whenever possible, especially trees larger than 6” trunk diameter measured at 4’ above grade. New projects shall include trees located and identified on the survey that are 12” diameter or greater, where practical.
31.1.2 Include in the construction documents the removal of trees and underbrush that is poisonous or otherwise harmful to children or staff.
31.1.3 Identify wetland areas requiring preservation or previous Corp of Engineers determination.
31.1.4 Identify and review with CMS, flood plain and tree save areas during schematic design phase.

31.2 GRADING
31.2.1 The Designer shall develop a cost effective grading plan that provides a balanced site. Topsoil shall be stockpiled and properly reused as required. The grading plan should consider areas required for future expansion.
31.2.2 Top of finish grade next to exterior wall shall be a minimum of 8” below finish floor except at building entrances.
31.2.3 Take care to design and construct appropriate ground slopes in order to eliminate temporary ponding during heavy rain and prevent runoff from entering the building. Prevent conflicts with storm water requirements.
31.2.4 Avoid steep slope designs (steeper than 3:1) unless approved in advance by the Owner. Provide a low maintenance non-invasive ground cover for long slope conditions.
31.2.5 The side slopes of ditches or swales shall be no steeper than 3:1. Provide a stabilized mesh at the bottom of all ditches and swales.
31.2.6 Grassed areas (except for retention/detention pond/banks) shall have a minimum slope of 1% and a maximum slope of 3:1.

31.3 STORM WATER CONTROL & DRAINAGE
31.3.1 CMS prefers the following methods in this order: wet retention pond, dry detention basin, swales, sand filter, underground detention basins, rain garden/bio-retention and wet lands. Designer to coordinate with AHJ.
31.3.2 CMS prefers reinforced concrete pipe for site drainage.
31.3.3 Playground drainage. See Appendix 31.3.3

32. EXTERIOR IMPROVEMENTS

32.1 PARKING AND VEHICULAR CIRCULATION
32.1.1 Refer to the current zoning ordinance for regulations regarding vehicular access to the site.
32.1.2 The safety of students shall be the primary consideration in designing vehicular circulation of the school site. Vehicle entrances and exits at the school site shall be located such that they facilitate safe access to and from the school. They should be designed without severe grade changes, blind curves and hills.
32.1.3 Provide striping for 5 lane walking track on bus lot for ES and K8 facilities. Provide indicator for distance on track.
32.1.4 Provide separate exit/entrance drives for bus parking and drop-off and visitors (cars) loading and drop-off. Entrance and exit driveways should be located to maximize visibility and with consideration for traffic flow during school hours.
Visitor parking spaces to be near the main entrance (administration) of the building and closer to the building than the staff parking.

Parking lots are to be located such that administration suite staff can monitor movement during the day.

Automobile parking is preferred to be 90 degree.

Traffic and pedestrian routes must have safe, logical, and adequate circulation.

Sidewalks should be provided adjacent to all parking lots with curb cuts at each intersection.

Access and parking not open to public view should be provided for cafeteria deliveries and for other service vehicles.

All parking spaces and drives should be properly lined and have arrows indicating exits and entrances with stop bars.

Provide maneuvering for large delivery trucks to loading area even when bus parking and visitor/staff parking areas are occupied. Generally most trucks that frequent the loading area are: Cube truck: 18’-0” long x 6’-0” wide x 10’-6” high. Warehouse truck: 24’ – 0” long x 7’- 0” wide x 13’ - 0” high.

Driveway turns should be laid out so the turning radius of each will adequately accommodate maximum-length wheel base buses and fire trucks.

Maximum parking lot slope shall be 5%.

Provide accessible parking spaces near the main entrance and near the main staff entrance in accordance with the ADA requirements.

Verify with CMS if speed bumps are to be included in the project.

Total closure gates are to be installed at bus lots for hard surface activities and lock down procedures. Gate post should be spaced more than 32’ apart to allow for mobile classroom installations. See Appendix 32.1.17

Asphalt paving shall be provided for all parking and driveways. Provide heavy duty pavement design for heavy use areas such as bus loading, and delivery trucks. Loading area and dumpster apron shall be reinforced concrete. Provide a minimum of 40’ reinforced concrete pavement in front of the dumpster enclosure. Paving at car parking areas and fire access shall be light duty pavement.

Curbs and accessible ramps shall be concrete. The car drop-off area and bus drop-off area need a continuous rolled concrete curb; however, note that code compliant curb cuts must also be located. Bollards and/or structures must be provided to prevent vehicles from driving up on the sidewalk. Roll-edge curbs are preferred.

Provisions are to be made for the installation of basketball goals and court striping at the perimeter of the bus parking lot. Goals should be in a visible location. Provide at ES, K8 and MS facilities.

Parking/Queue (Stacking) Requirements: Confirm parking and queue totals with CMS staff, quantities are a minimum goal. Provide car stacking for peak flow during drop-off and pick-up of students per NCDOT.

<table>
<thead>
<tr>
<th>Facility Type (Classroom #)</th>
<th>Bus Spaces</th>
<th>Car Spaces - Staff</th>
<th>Car Spaces - Visitors</th>
<th>Bus Lot Over Stripe*</th>
<th>Student</th>
<th>Car Queue</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES (45)</td>
<td>18</td>
<td>100</td>
<td>25</td>
<td>100-125</td>
<td>0</td>
<td>1,380 linear feet</td>
</tr>
<tr>
<td>MS/K8 (54/63)</td>
<td>24</td>
<td>125</td>
<td>25</td>
<td>125-150</td>
<td>0</td>
<td>2,003 linear feet</td>
</tr>
<tr>
<td>HS (125)</td>
<td>40</td>
<td>200</td>
<td>25</td>
<td>250-300</td>
<td>Per zoning (1 per 5 students)</td>
<td>2,700 linear feet</td>
</tr>
</tbody>
</table>

*Provide for planning purposes on the design development and 95% construction documents but do not include on the building permit submittal.

At student drop-off (or pick-up) from buses, and drop-off (or pick-up) from cars, students shall not cross parking areas or drives. Avoid students having to cross parking lots or streets to get to the play fields, which should be as close as possible to the building.

Provide minimum 12’ x 50’ canopy at bus lot per ADA code at elementary schools. Provide minimum 12’ x 50’ canopy at middle and high school bus lots if project budget allows.

An accessible space should be provided parallel to the path of vehicular travel, beyond the front door for van loading/unloading.

Provide control signage at parking lots.

The parking area should be of sufficient size to accommodate all buses serving the school. Additional undeveloped space should be considered for future growth.
32.1.28 The bus parking area should be so planned that the movement of buses on the school site will be kept to a minimum. Bus parking should be established so that backing-up of buses is avoided.

32.1.29 The bus parking area should be located adjacent to playground areas and should be separate from all other vehicle parking areas.

32.1.30 Preference for one single row of bus parking. If site conditions do not allow, it is acceptable for bus parking to be stacked nose to tail.

32.1.31 Pupils unloading from the bus door will walk away from the bus toward the school entrance.

32.1.32 Pupils shall not cross any driveway on which other vehicles may be moving, and buses arriving on the lot will not cut through the line of pupils walking to the school entrance.

32.1.33 Bus Circulation Requirements:
32.1.33.1 Accommodate the 84-passenger capacity buses.
32.1.33.2 Minimum turning radius is 26’ inside; 45’ outside.
32.1.33.3 Bus lot to be minimum 110’ wide, preference for 120’ wide for turn radius and to accommodate overflow parking.
32.1.33.4 Bus parking space: min. 12’ wide; max. 14’ wide x 35’ long.
32.1.33.5 Maximum parking slope is 2% (the fueling procedure dictates this slope).
32.1.33.6 Maximum driveway slope is 8 degrees.
32.1.33.7 Lot to be well-drained and paved for a vehicle carrying 27,000 pounds.
32.1.33.8 Note on construction documents for existing paving to be re-cycled for on-site re-use.

32.2 SIDEWALKS AND PLAZAS
32.2.1 Review safety surveillance during the design of plazas, and parking with CMS. Special attention to be given to provide adequate visual control to the bus loading/unloading, staff, student parking, and visitor parking area to prevent potential concealed spaces near these and other drives.

32.2.2 Surfaces to be slip resistant under wet and dry conditions and to slope to drain away from building.
32.2.3 Pedestrian areas at major entrances shall have a minimum pavement width of 15’.
32.2.4 The width of walkways at minor entrances shall be 3’ wider than the entrance door(s).
32.2.5 The designated crosswalk zone shall be provided at all pedestrian walks crossing drives and shall meet ADA requirements.
32.2.6 Sidewalks shall be concrete and 5’ – 6’ wide minimum (widths shall be determined by pedestrian usage). Maximum sidewalk slope 5%.
32.2.7 Provide appropriate control joints (6’ o.c. max) and expansion joints in sidewalks and plazas to control cracking. Sidewalks (or concrete pavement) where service vehicles are anticipated should be designed and reinforced appropriately.
32.2.8 Locate sidewalks where pedestrians are most likely to walk in direct routes. Provide triangular infill at intersections.
32.2.9 All outside exits must have concrete sidewalk and extend to a public way where required by code.
32.2.10 At walks and paths, provide a minimum cross slope of ¼” per foot, not to exceed ADA requirements.
32.2.11 Plazas shall have a maximum slope of 2% with a uniform surface that prevents puddling/ponding.
32.2.12 Provide accessible route to Flagpole.
32.2.13 When site stairs are required, provide ramp access in the same location.
32.2.14 All trench drain grate slots in courtyards, pathways and means of egress shall be 3/8” wide maximum.

32.3 LANDSCAPING
32.3.1 General
32.3.1.1 Provide minimum buffers to comply with local ordinance.
32.3.1.2 Landscape design should preserve and enhance existing resources, improve overall environmental quality, minimize maintenance requirements and improve the visual quality of the site.
32.3.2 Trees and Shrubs:
32.3.2.1 Select trees from the local municipalities approved list.
32.3.2.2 Landscape plants should be selected to require a minimum of maintenance. Use of native and non-invasive species is preferred.
32.3.2.3 Do not use invasive plants and do not use poisonous plants or plants with sharp thorns or foliage near student’s path of travel.
32.3.2.4 Landscaping must be specified to be planted in the fall.
32.3.2.5 Do not specify or locate planting material that will cause security problems, i.e., create hiding places. For example; shrubs no taller than 3’ and trees limbed below 7’.
32.3.2.6 Do not plant trees or shrubs in locations that will interfere with overhead, underground utilities, site lighting, or security cameras.
32.3.2.7 Trees and shrubs to be readily available, locally if possible. Trees and shrubs to be native or hardy to the site area.
CIVIL

32.3.2.8 The mature height and spread of all trees and shrubs to be considered during the design process. Trees and shrubs are not to be too close together or close to buildings. Avoid the overgrown look when plantings are mature.

32.3.3 Grass and Ground Cover:
32.3.3.1 Existing stockpiled topsoil or new topsoil must be spread and fine graded prior to installation of grass and ground cover.
32.3.3.2 Non-mowable and long slopes to be covered with appropriate vegetative ground cover with non-eroding mesh.
32.3.4 Soil
32.3.4.1 Topsoil shall be free of subsoil, roots, clods, stones, brush, weeds, or other debris and shall not contain any material toxic to plant growth.
32.3.4.2 New fill dirt and topsoil shall be tested for hazardous material prior to being moved onto site.
32.3.4.3 Areas next to the building and particularly courtyards get compacted by construction activity. These areas must be ripped and tilled after construction prior to installation of topsoil, landscaping or grassing.
32.3.4.4 Pre-installation of grassing/landscaping: Review soil conditions for (1) amount of rock and stone, and (2) depth of topsoil and condition of soil. Landscaping shall not void termite warranty.

32.4 FENCING
32.4.1 Fencing around storm water detention basins to be 5'-0" high, with (1) 12'-0" wide access gate for maintenance.
32.4.2 Fencing around track/football field to be 4'-0" high and with 10' wide access gates for emergency vehicles. The track/football field fence should have (2) remote, 4'-0" gates on each side, for band and cheerleaders, and (1) 12'-0" gate for equipment access.
32.4.3 Fencing around baseball and softball fields to be 5'-0" high and (2) 4'-0" with (1) 12'-0" equipment access gate.
32.4.4 Fencing around tennis courts to be 10'-0" high with vision screening mesh.
32.4.5 Fencing at discus throw to be 8'-0" high.
32.4.6 Provide Athletic playfield backstop at softball and baseball fields.
32.4.7 Exterior fencing around HVAC and electrical equipment, i.e., generator, transformer and chiller, etc., to be enclosed with code and service clearances and gates for service and maintenance.
32.4.8 Fencing used to reduce buffer widths shall meet the requirements of the local zoning department.
32.4.9 Provide steel lockable gates with duckbill latch at each post at bus and staff parking lots, see appendices.
32.4.10 Provide Knox padlock and CMS padlock at each vehicle gate.
32.4.11 All gates used as egress routes must have a sign attached stating “THIS GATE MUST BE UNLOCKED DURING ALL OCCUPIED HOURS”.
32.4.12 Provide decorative fencing outside of PK – 1 classroom egress doors to create a play area and that has a 4'-0" wide egress gate.

32.5 FLAGPOLE
32.5.1 At Elementary, Middle, K8 and High Schools provide one aluminum flagpole with a maximum height of 30’ at a prominent location near the primary building entrance.
32.5.2 At Middle, K8 and High Schools provide one aluminum flagpole with a maximum height of 30’ at main athletic field.
32.5.3 Provide solar powered LED lighting device that clamps to the pole at all flag pole locations.

32.6 SPIRIT BOULDER
32.6.1 If a large boulder is found during construction of any facility type, it should be moved to a location identified near the front entrance for student painting. If no is boulder present, identify location for future boulder.

32.7 SITE EQUIPMENT
32.7.1 When requested, provide accessible benches and route near the main entrance of the building. Seating is required in the pedestrian area of the main staff entrance and student courtyards. Bench design should be compatible with the building design. Benches shall be freestanding and anchored to be immovable.
32.7.2 Provide bike racks per ordinance.
32.7.3 Provide separate Knox Boxes for Fire and Police Departments at main entry and at fire riser (Fire only).
32.7.4 Provide Knox Locks at site access gates.
32.7.5 Provide Knox Cap at FDC.
32.7.6 Playground equipment for replacement schools should match school colors to the extent possible using standard color options from the playground equipment manufacturer.
32.7.7 Provide concrete pad (12’ x 21”) for each CMS provided Conex storage unit (8’ x 20”) with accessible walk. Provide fencing, gates, etc., or incorporate units within service yard as directed by CMS. Elementary schools receive one unit, Middle Schools and K8 receive two units, and High Schools receive three units.
32.7.8 Coordinate mailbox location with CMS and local postmaster serving that facility. Do not mount mailbox on the building.

32.8 SERVICE AREA – DUMPSTERS
CIVIL

32.8.1 Solid waste is to be collected in dumpsters located in the service area. Provide space for two garbage dumpsters and one cardboard recycling dumpster. Dumpsters are approximately 6’ x 6’ and require approximately 4’ – 5’ between them.

32.8.2 Provide bollards, see appendices for locations and details.

32.8.3 Dumpster enclosure to be constructed of masonry to match building. See Appendix 32.8.3

32.8.4 Provide exterior access to the loading area in the vicinity of the kitchen, to comply with Health Department restrictions for trash not being transported through kitchen.

32.8.5 Refer to the Charlotte zoning ordinance for screening requirements and Fencing Guide below. Dumpsters are to have a lockable gate, or gates, on a rubber roller wheel. Gate construction shall be galvanized or aluminum. Refer to appendices.

32.8.6 All dumpsters are to be located on reinforced concrete slab. Provide striping on the pavement that reads “No Parking”.

32.8.7 Provide heavy-duty concrete paving in all truck turn around areas.

32.9 ATHLETIC FIELDS

32.9.1 High School Softball/Baseball Field Standards: Dugouts for softball recommend that distance from foul line to nearest obstruction shall be 25’ minimum to 30’ maximum. Dugouts for Baseball recommend that the distance from foul line to nearest obstruction shall be 60’. See Appendix 32.9.1

32.9.2 Provide ADA access to all bleacher seating.

32.9.3 Provide synthetic turf football fields at high schools with cannon type irrigation, all areas within the track to be synthetic turf other than field event areas outside of the field (“D” zone) to match track material. Size field area for football and soccer.

32.9.4 All middle school football fields to be natural grass fields with irrigation. All baseball, softball and soccer fields to be natural grass fields with irrigation.

32.9.5 Athletic field preparation

32.9.6 Softball field/football field/Soccer field/Baseball field preparation and Warning Track mixture

32.9.7 Fertilizer – commercial grade 17 17 17. Apply at 300 lbs/acre or as required by soils analysis

32.9.8 Lime – Dolomite limestone containing not less than 85% total carbonates and shall be ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve. Apply at 1.5 tons/acre or as required by soils analysis.

32.9.9 Sand – C-10 sand shall comply with USGA specifications for compaction and percolation. Sand shall be weed, disease, and insect free. Apply at 300 tons/acre (1.5 inch depth).

32.9.10 Infield and Outfield GRASSING, fertilizing and sub soil PREPARATION.

32.9.11 Obtain soils test in three locations per field from a qualified soil laboratory.

32.9.12 Remove any temporary grassing with herbicide.

32.9.13 Remove all rocks ½ inch diameter and larger and any other debris in top 3 inches of soil by making two passes over the initial grade in opposite directions with a rock hound or similar machine.

32.9.14 Add soil amendments and lime per soil test.

32.9.15 Apply organic poultry compost at 80 cubic yards/acre.
INTRODUCTION
Division 33 represents coordination of the design with the water, natural gas, electrical power, and future mobile classrooms of this Standard. It is intended to assist a qualified Civil Engineer in their preparation of drawings and specifications for the overall utility systems and future mobile classroom coordination. The Civil Engineer has the primary responsibility of designing the systems through collaboration with the Architect, Owner and various utility companies serving Mecklenburg County. This information is not intended to serve as a code book or a construction specification. It also does not relieve the Civil Engineer of their responsibility for adequate design, coordination, and for compliance with the criteria provided by Charlotte-Mecklenburg Schools for a specific project.

Division 33 is compiled primarily to describe the utility systems for new schools. In schools undergoing expansion and/or renovation, extent and condition of existing facilities and budget restraints may limit the scope of the utility renovations. In such cases, where feasible, the design shall facilitate the future implementation of the “New School” criteria.

The A&E and construction manager/general contractor shall obtain from the CMS the latest version of the Charlotte-Mecklenburg Schools Architect and Engineer Design Guide.

33. UTILITIES

33.1 GENERAL
33.1.1 Designer should review site for available utilities and the requirements for each utility prior to the schematic design submittal.
33.1.2 Separate water tap, meter, back flow preventer per code for domestic water, irrigation, fire protection.
33.1.3 If lift station is required provide a hoist at lift station with a capacity for lifting the pump.
33.1.4 If plumbing clean out and underground valves in grassy areas shall be installed with white, donut precast concrete fittings.
33.1.5 All underground piping shall be installed with metallic marking tape above the utility.
33.1.6 Contractor to coordinate with gas utility to provide pulse meter attachment to gas meter. The cost of the pulse meter is the responsibility of the contractor and coordination with the utility is required. Size of the pulse meter to be determined by utility based on load information provided by mechanical engineer.
33.1.7 Contractor to coordinate with electric utility to provide pulse meter attachment to electrical transformer.

33.2 SITE LIGHTING: Refer to Electrical

33.3 MOBILE CLASSROOMS
33.3.1 Future mobile classroom locations shall be established and approved during schematic design by CMS. See mechanical, electrical and plumbing sections for additional requirements.
33.3.2 Provide stub connections in a heavy duty underground vault for a 2” water line, 4” sewer line and two 3” conduits for fire alarm, intercom and telecommunications.
33.3.3 Architect and Civil Engineer to include on all appropriate site plans, proposed locations of future mobile classroom units and all associated site utilities required at each unit. Construction documents to be designed and drawn to account for all coordination required during construction to accommodate the safe, three-dimensional installation of utilities needed for the permanent school buildings in conjunction with all temporary buildings on site or proposed to be on site. See Appendix 33.3.3
33.3.4 The typical arrangement is: High Schools one, 10 Classroom Modular Unit or 10 single mobile units and associated restroom unit; Middle Schools and K8s one, 10 Classroom Modular Unit or 10 Single mobile units and associated restroom unit and Elementary Schools, 6 Single mobile units and associated restroom unit.
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1.2 SHEET NAME AND NUMBERING STANDARD

6.1.7 MAILROOM CASEWORK

6.1.8 WORKROOM CASEWORK

6.2.3 ES CLASSROOM CASEWORK

6.2.4 ES CLASSROOM CUBBIES

8.3.12 DOOR ID TAG

9.3.2 MULTIPURPOSE ROOM STRIPING

9.3.3 GYM STRIPING

9.9.1 VOLLEYBALL SLEEVE

10.8.1 SIGNAGE

10.8.4 DEDICATION PLAQUE

11.1 ES KITCHEN EQUIPMENT

11.2 K8 KITCHEN EQUIPMENT

11.3 MS KITCHEN EQUIPMENT

11.4 HS KITCHEN EQUIPMENT

27.1.11.27 T-001 MDF EQUIPMENT DETAIL

27.1.11.27 T-002 MDF LADDER RACK DETAIL

27.1.11.27 T-011 MDF DATA RACK ELEVATION

27.1.11.28 T-003 IDF EQUIPMENT DETAIL
APPENDICES

27.1.11.28 T-004 IDF LADDER RACK DETAIL

27.1.11.28 T-012 IDF DATA RACK ELEVATION

27.1.18.3 CMS IS&S CABLE DESIGN STANDARDS REV AUGUST 2018

27.1.18.4 T-100 ELEMENTARY CLASSROOM TYPICAL

27.1.18.4 T-101 INSTRUCTIONAL COMPUTER LAB

27.1.18.4 T-101 A CTE COMPUTER LAB

27.1.18.4 T-102 SCIENCE AND PREP TYPICAL

27.1.18.4 T-103 OFFICES EXAMPLES

27.1.18.4 T-104-A K8 MEDIA CENTER SPACES EXAMPLE

27.1.18.4 T-104-B K8 MEDIA CENTER SPACES EXAMPLE

27.1.18.4 T-105 ES AND K8 RECEPTION EXAMPLE

27.1.18.4 T-106 KITCHEN AREA EXAMPLE

27.1.18.4 T-107 MULTI-PURPOSE ROOM EXAMPLE

27.1.18.4 T-108 MS HS CLASSROOM TYPICAL

27.2.1 SOUND SYSTEM DIAGRAMS

28.1.5 DOOR ACCESS CONTROL

31.3.3 PLAYGROUND DRAINAGE

32.1.17 VEHICLE GATE

32.8.3 DUMPSTER ENCLOSURE

32.9.1 SKINNED INFIELD
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6.1.7 Mailroom Casework

- Additional Bay at HS
- Rout webs at one third points horizontal and vertical for changeable 1/4" hardboard divider slats
- Fortieth Deep Mail Cubes at ES, KB and MS, Forty-Eight Mail Cubes at HS
- 24" Deep Base Cabinet
- Adjustable shelving
APPENDICES

6.1.8 Workroom Casework

FRONT ELEVATION

REAR ELEVATION

SIDE ELEVATION
6.2.3 ES Classroom Casework

Note:
Counter top height to be 2'-6" A.F.F. at 2-5 grades
Counter top height to be 2'-2" A.F.F. at K-1 grades
APPENDICES

6.2.4 ES Classroom Cubbies
8.3.12 Door ID Tag

Edge of door beyond

1 1/8"

Low profile pan head hardware at wood doors, rivits at metal doors

1/2" high engraved building wing/area designation

1/16" thick brass tag

1/4" high engraved architectural plan door designation

Provide a brass ID tag to be recess mounted on the hinge edge of every wood door equal distance above the top hinge and the top of the door. Provide two identical tags at paired doors. Tags identify door numbers based on architectural plans submitted to the fire marshal.
9.9.1 Volleyball Sleeve

Wood gym floor system

Volleyball sleeve insert

Thickened concrete slab around insert
9.3.2 Multipurpose Room Striping
9.3.3 Gym Striping

- Basketball striping to be black
- Volleyball striping to be white
- PE/Sidecourt striping to be grey

Provide a school logo at center court

Line Crossing Hierarchy:
1. Basketball Striping
2. Volleyball Striping
3. PE/Sidecourt Striping

Center the volleyball court on the basketball court

Align PE/Sidecourt striping with volleyball outline

Provide school name at one end of the court and school mascot name at the other
10.8.1 Signage

- Typical screw mounting placement
- Primary copy
- Secondary copy
- Braille
- Second clear acrylic window with insert slot (if required)
- First clear acrylic window with insert slot (if required)
- Door inventory number
APPENDICES

10.8.4 Dedication Plaque

"NAME OF SCHOOL"
CHARLOTTE-MECKLENBURG BOARD OF EDUCATION

"NAME OF CHAIRPERSON" - CHAIRPERSON
"NAME OF VICE CHAIRPERSON" - VICE CHAIRPERSON

"NAME OF BOARD MEMBER" - At Large
"NAME OF BOARD MEMBER" - District 1
"NAME OF BOARD MEMBER" - District 2
"NAME OF BOARD MEMBER" - District 3
"NAME OF BOARD MEMBER" - District 4
"NAME OF BOARD MEMBER" - District 5
"NAME OF BOARD MEMBER" - District 6

"NAME OF SUPERINTENDENT" - SUPERINTENDENT
"NAME OF ARCHITECTURE FIRM" - ARCHITECT
"NAME OF CONSTRUCTION MANAGER" - CONSTRUCTION MANAGER

2077

Use the names of board members active at the time of construction cost approval.

Cast bronze plaque with 1/4" raised Times Roman lettering, dark bronze leatherette background, single line border edge, and concealed stud mounting.
APPENDICES

11.1 ES Kitchen Equipment (1 of 23)

CHARLOTTE-MECKLENBURG SCHOOLS CHILD NUTRITION SERVICES

ELEMENTARY SCHOOL

KITCHEN EQUIPMENT SPECIFICATIONS AS OF DECEMBER, 2018

ALL FOODSERVICE EQUIPMENT TO BE NSF AND/OR UL APPROVED WHENEVER APPLICABLE

IF DISCREPANCY EXISTS BETWEEN THE WRITTEN DESCRIPTION AND MODEL NUMBERS, THE WRITTEN DESCRIPTION WILL TAKE PRECEDENCE.

ITEM 1 - NOT USED

ITEM 2 SPECIALTY DISPLAY CASE - QUANTITY AS SCHEDULED

A. Merchandiser-Air Curtain
B. Solid Rear Sliding Access Doors
C. Stainless steel interior, including Shelves
D. Two tiered shelves
E. Air temperature maintained at constant 35-40 degrees F
F. On-demand PTC condensate evaporator provided for a totally self-contained system.
   A condensate pump is required on the LPRSS5 and LPRSS6.
G. Clearly visible thermometer to indicate air temperature
H. Provide optional casters
I. Provide optional lockable night cover
J. Light below shelves
K. Provide optional LED lighting
L. Unit pre-wired 115 / 60 / 1 for 15 amp dedicated outlet

Approved Manufacturer: Federal Refrigerated Self-Serve Low Profile Specialty Merchandiser, or pre-approved equal.
Revised 10-29-07, Revised 11-21-08, Revised 5-15-15, Revised 7-25-17

ITEMS 3-4 - NOT USED
APPENDICES

ITEM 5  BOOSTER HEATER – (1)
Provide compact booster heater having the following features:
A. Castone, glass lined, or silicone bronze tank, 6 gallon capacity.
B. Low-water cut-off, temperature/pressure relief valve, pressure reducing valve, temperature/pressure gauge, and shock absorber.
C. Standard finish body and base.
D. Electrical characteristics as scheduled.
E. Under-counter mounting kit.
Approved Manufacturer: Hatco Corporation, Model C36, or pre-approved equal.

ITEM 6  NOT USED

ITEM 7 BRAISING PAN GAS – (1) (FUTURE)
Provide hood space and all utilities for future installation
Approved Manufacturer: Cleveland SGL-30T

ITEM 8  NOT USED

ITEM 9  CART, TRAY - QUANTITY AS SCHEDULED
Provide tray and silver cart with the following features to match Items 12,15,17,30,31,100.
A. Stainless steel construction.
B. One bottom shelf.
C. Tubular frame.
D. 5” casters.
E. Modify height to 36” overall for elementary school use.
F. Include optional napkin holders for folded 3 1/2” wide X 5” high napkins
Approved Manufacturers: Colorpoint Model CPM-MTS-MOD, Delfield UTS-1-MOD

ITEM 10: CART, UTILITY, THREE TIER  (4)
A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 18” X 32” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers protect walls and furniture
E. 500 lb. capacity per shelf
F. 5” all swivel casters
G. NSF
Approved manufacturer: Choice Equipment UC20-3321-3, Lakeside 544, Win-Holt SSUC-3-2133SS.
Revised 07-15-10, Revised 7-25-17

ITEM 11: CASH REGISTER –QUANTITY AS SCHEDULED
PROVIDED BY OWNER
APPENDICES

ITEM 12: CASHIER STAND - QUANTITY AS SCHEDULED

Provide modular counter of size and content as shown on plan and detail drawings, having the following features to match Items 9, 15, 17, 30, 31, 100

B. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
C. 14 gauge stainless steel plain top with highlighted finish, turndown on all sides and corners fully welded, ground, and polished.
D. Solid 12" wide, 14- gauge stainless steel, “V" type tray slide for both sides mounted at 28".
E. 1" diameter 18-gauge stainless steel foot rest shall be secured to the interior walls.
F. 4" diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels.
G. Provide a 2" diameter ferrule hole with rubber grommet in center top for elec. cords.
H. 18 gauge stainless steel liner
I. Line-up locks on opposing corners.
J. One convenience outlet mounted inside the counter with 115v/15a outlet with 10 amp breaker.
K. Stainless steel drawer, lockable.
L. A 10" wide fold-down stainless steel shelf is to be mounted at 28” to back of cashiers stand to hold keypad provided by others. Delete shelf if cashier stand is not free-standing.
M. Provide a 2" diameter ferrule hole with rubber grommet in back of stand with conduit to feed electrical cords from keypad to convenience outlet located inside of stand.
N. Color: Black
Approved Manufacturers: Colorpoint, Model 36-CSE-F, Delfield KCS-36, modified to above specifications, or pre-approved equal.

ITEM 13 CART, UTILITY, TWO TIER (4)

A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 21” X 33” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers
E. 500 lb. Capacity per shelf
F. Two shelves.
G. 5” all swivel casters
Approved manufacturer: Choice Equipment UC20-3321-2, Lakeside 543, Win-Holt UC-2-2133SS
Revised 10-15-07, Revised 07-15-10

ITEM 14  NOT USED
APPENDICES

ITEM 15  COUNTER, PLAIN TOP QUANTITY AS SCHEDULED

Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 9, 12, 17, 30, 31, and 100
A. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. Body lined with 18 gauge stainless steel.
C. Open base in rear of cabinet.
D. 30" wide 14 gauge stainless steel top with highlighted finish.
E. Solid 12" wide, 14-gauge stainless steel, "V" type tray slide, mounted 28" AFF.
F. Fold down cutting board on server side, to facilitate restocking
G. 4” ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
H. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
I. Install in banked line-up as shown on drawings.
J. Color: Black.
Approved Manufacturers: Colorpoint Model 60-ST-F, Delfield KC-60-NU modified to above specifications, or pre-approved equal.

ITEM 16  NOT USED

ITEM 17  COUNTER, HOT SERVING - QUANTITY AS SCHEDULED

Provide modular serving counter of size and content as shown on plan drawings, having the following Features to match items 9, 12, 15, 30, 31, 100
A. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. Body lined with 18-gauge stainless steel.
C. Base to have under-storage with shelf and fiberglass door panels with locks.
D. 30" wide 14-gauge stainless steel top with square turndown on all sides and corners fully welded, ground and polished.
E. Recessed top accept 18" X 26" sheet pans.
F. Five individually controlled dry/moist wells, with solid state digital controls wired to circuit breaker for current overload protection.
G. Control panel to be hinged for service access.
H. Hot food drains for each food well shall be plumbed to common manifold and extended to shut off valve under holding wells. Provide 4’ flexible hose to drain.
I. Solid 12” wide, 14-gauge stainless steel, "V" type tray slide, mounted at 34”.
J. 5” ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
K. 10” shelf on server side, fold down, and 14-gauge stainless steel.
L. Single tier tempered glass over shelf with front tempered glass shield that is adjustable to allow attendant or self-service. Full sloped front protector to prevent customers from touching food. Ends top, and front to be 3/8" tempered glass. Versa-Gard VG 6S, Flexishield or approved equal.
APPENDICES

M. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
N. Replacement Panels (5 ea.)
O. All equipment to be built in accordance with Underwriters Laboratories, Inc. and bear the UL complete Unit listing label, no component parts listed equipment will be accepted, and shall also bear the UL listing seal for safety and certification label for sanitation.
P. ELECTRICAL: 208 Volt / 1 phase /Max 2500 Watts
   Plug to be 120V-250V / 50 AMP / Twist Lock/ 4 wire/ Male.
Q. Curved Infrared heat strip with LED lights built into the heat strip housing and wired to separate infinite control with on/off switch, and fused as required. Hatco Glo-Ray Model GR5AL- or preapproved equal. Black in color.
R. Color: Black
   Approved Manufacturers: Colorpoint, Model EF5-CPA-F, Delfield KH-5-NU- modified to above specifications, or pre-approved equal
   Revised 6-1-06, Revised 11-25-08, 7-25-17, 12/19/18

ITEM 18 COUNTER, SOLID TOP, FROST TOP – NOT USED
   Revised 10-29-07

ITEM 19 TRASH COUNTER- NOT USED
   Revised 7-15-06

ITEM 20 - NOT USED

ITEM 21 CUTTER, FOOD, NOT USED
   Revised 10-29-07

ITEM 22 NOT USED

ITEM 23 TRAY DOLLY – QUANTITY (6)

   A. 16 gauge, 304 stainless steel construction
   B. 800 pound rolling capacity
   C. Holds 2 stacks of 12” X 16” cafeteria trays
   D. 1 ¼” lip to securely hold trays
   E. 5” all swivel casters
   F. Lifetime guarantee against rust or corrosion
   Approved Manufacturers: Choice Equipment UC200-1625, Lakeside, Win-Holt D1625/SS,
   Revised 10-29-07, 07-15-10, 10-05-15, 7-25-17
APPENDICES

ITEM 24   TROUGH, FLOOR, STAINLESS STEEL - QUANTITY AS SCHEDULED

Provide floor trough with removable grate having the following features:
Grate:
A. All Stainless steel welded construction.
B. 3/16" x 1" flat bars set on edge, with 13/16" clearance between bars.
C. Two 1/2" diameter rods wedged through bars full length, and weld to each bar.
D. Size to suit trough with removable sections not to exceed 20" long.

Trough:
E. 14 gauge 304 18-8 stainless steel, all welded with coved corners and anchor straps, full perimeter flange for installation under grout.
F. Pitch to waste and provide stainless steel cup with removable perforated stainless steel basket.
G. Overall trough size is to be approximately 1'-6" wide ~x 2'-0" long.
H. See plan for clarification. Coordinate with General Contractor and Plumbing Contractor to assure proper installation.

Approved Manufacturers: IMC/Teddy Food Service Corp. Model FT-SG, Serv-o-Lift, Eastern, or pre-approved equal.

ITEM 25 NOT USED

ITEM 26 DISH MACHINE

Provide gas powered machine with following features:
A. 44” machine
B. Convertible for low temperature or hot water final rinse
C. #16 gauge stainless steel tank and chamber. Provide oversized wash chamber option to accommodate sheet pans in upright position
D. 2 HP machine power wash motor with stainless steel pump and impeller
E. Self draining pumps
F. 15 KW electric immersion heater, interwired at factory. Heater is to have solid state thermostat with positive low water protection.
G. Top mounted dial thermometers mounted in stainless steel enclosure. Motor controls wired to common electrical point in stainless steel control center mounted on top of machine. Motors to have built-in thermistor overload protection with manual reset.
H. Dual side pawl conveyor driven by 1/6 HP motor.
I. Minimum capacity of 203 racks per hour
J. Ball detent clutch system to prevent damage to conveyor and drive motor if rack should be obstructed.
K. Stainless steel upper and lower wash arms with anti-clog nozzles. Both wash arms to be removable for cleaning without use of tools.
L. Final rinse automatically activated by racks in passing. Rinse agent dispenser injector and electrical interface points. Final rinse rate to be 5.0GPM.
APPENDICES

M. Automatic fill with tank water level automatically maintained. Fill to be interrupted if door is opened. Drain handle to be located inside tank chamber and to be closed automatically upon lowering of inspection door.
N. Stainless steel front panel, frame, feet and legs.
O. Energy saver auto timer
P. Removable self-flushing stainless steel strainer pans and large deep stainless steel basket removable from front of machine.
Q. Door safety interlocks on all doors
R. Pump intake screen assembly
S. Built in integral wiring channel
T. Vent fan control
U. Stainless steel splash shields
V. Plastic strip curtains throughout
W. Conveyor dwell switch
X. Table limit switch
Y. 2 vent cowl with locking dampers
Z. 4 peg, 2 combinations and 2 bun pan dish racks included

AA. Machine to have as standard a full two year warranty against manufacturer’s defects on parts, labor, and mileage. Extended 3 year warranty is to be provided making 5 years total coverage

BB. Energy Star Certified

Approved Manufacturers: Hobart Model CL44E, Champion 44 PRO VHR, Stero
Revised 5-10-04, Revised 10-29-07, Revised 11-25-08, Revised 07-15-10, 7-25-17

ITEM 27 NOT USED

ITEM 28 DISPENSER, ICE (1)

Provide ice dispenser with following features:
A. Stainless steel exterior cabinet with merchandiser and “Ice” sign.
B. Push lever ice-dispense.
C. 45 pound ice storage capacity.
D. Electrical 120V/60HZ/2.5FLA.
E. Two ¾” PVC drain fittings, one from drain pan and one from bin.
F. Dispenses any size cube ice up to one-inch square.
G. Motor, drain and electrical connections are front-serviceable.

Approved Manufacturers: SerVend Model M45, or pre-approved equal.

ITEM 29 QUANTITY (2)

A. Horizontal ice cream freezer with glass angled lid
B. Internal LED lighting
C. Lid lock with keys
D. 1 ½” dual swivel casters
E. Power indicator light
G. Slide-out, easy access condensing unit
APPENDICES

H. Maintain Temperature -18 to +10 degrees
J. Three baskets with dividers
K. External mounted thermometer
L. 115V/60/1 with 9’cord and plug attached

Approved Manufacturer: NorLake CTB-43-9 or pre-approved equal
Revised 6-1-06, Revised 10-29-07, Revised 07-15-10, 77-25-17

ITEM 30  DISPENSER, MILK (MUST BE OPEN FRONT) ELEMENTARY SCHOOLS - QUANTITY AS SCHEDULED

Provide mobile carton milk cabinet having the following features:
A. Stainless steel interior and exterior
B. Top mounted Removable refrigeration system
C. Forced air refrigeration system
D. Sliding lift up and down door(s)
E. Reinforced cabinet interior bottom. Capacity to hold (12) standard milk cases.
F. Floor drain with plug
G. 6” casters
H. 3 year parts and labor warranty, 5 year compressor parts warranty
I. Magnetic snap-in EZ clean door gaskets

Approved Manufacturer: Traulsen RMC49DR, or pre-approved equal

ITEM 31  - COUNTER, SOLID TOP, FOR CONDIMENTS AND ACCESSORIES (1)
Provide modular serving counter to match items 9, 12, 15, 17, 30, and 100, with the following features:
A. 30” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less. (total counter height to be 30”)
B. Total length of unit to be 60”
C. Body lined with 18-gauge stainless steel.
D. Base to have under-storage with shelf and fiberglass door panels with locks
E. 30’wide, 14-gauge stainless steel top with highlighted finish
F. Solid 12” wide, 14 gauge stainless steel, “V” type tray slides on both sides, mounted 28” AFF.
G. 4” diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.

Approved Manufacturer: Colorpoint or Delfield modified to meet specifications.

ITEM 32  DISPOSAL, FOOD PREP & POTSINK AREA

Delete from specifications: Revised 07-15-10
APPENDICES

ITEM 33   DUNNAGE RACK - QUANTITY AS SCHEDULED

Provide single deck dunnage platform unit with the following features:
   A. One piece rust and corrosion proof polymer construction.
   B. Slotted deck.
   C. Racks join together end to end or back to back with bow tie feature
   D. Heavy duty construction – each rack holds up to 1500 pounds
   E. Arrange as shown on Plan drawings, using quantities and sizes as specified.
Approved Manufacturers: Cambro, Metro, Eagle, Amco
Revised 07-15-10

ITEM 34   DISPOSAL, DISHWASH AREA   (1)

A. Voltage characteristics as scheduled.
B. 18” diameter stainless steel cone for welding to drain-board.
C. Auto-reversing control center including, magnetic starter(s) and start/stop buttons, in stainless steel NEMA 4 enclosure, or better, with disconnect switch.
D. Thermal overload protection either built into motor or in control center with manual reset.
E. Solenoid and vacuum breaker.
F. Control center to be mounted out of splash zone, under drainboard on stainless steel mounting bracket as shown on details.
G. Short neck as necessary to provide clearance under disposal.
H. Coordinate installation of pre-rinse unit (item #65)
I. Low water pressure cutoff, with time delay for water after cut off occurs
J. Permanently lubricated ball bearings
K. Tubular stainless steel legs with bullet feet adjustable to 3 inches in either direction
L. Rubber isolating ring at cone mounting to reduce vibration and noise
M. Air cooled motor.

Approved Manufacturers: Bus Boy Model 3000, Hobart, Insinkerator
Revised 7-20-06 , Revised 10-12-07

ITEM 35-36   NOT USED

ITEM 37   EXHAUST HOOD - (1)

Refer to the most current version of the Division 15 Mechanical & Plumbing Design Guidelines, sections 4.01, A, B, and C.
ITEM 38  FAN, AIR CURTAIN- (1)

Provide air curtain fan having the following features:
   A. #304 stainless steel exterior with adjustable deflectors and adjustable air intake.
   B. Electrical characteristics as scheduled.
   C. Micro-switch for automatic door-actuated on-off control.
   D. 5-year parts warranty.
Approved Manufacturers: Berner model ASR1036A-SS, Mars Door Company, Model48CH, Universal Jet Industries
Revised 07-15-10

ITEM 39  EQUIPMENT STAND (for item 87, if required)

Approved Manufacturer: Hobart Model, 205025, or pre-approved equal

ITEM 40  FIRE SUPPRESSION SYSTEM – (1)

Provide automatic fire control system as required to protect exhaust hood, Item 37, and the cooking equipment located under this hood, and having the following features:
   A. All tanks, control heads, piping, relays, cable, fusible links, nozzles, elbows, etc., as required for complete system.
   B. Brass nozzles and chrome plated or sleeved exposed piping.
   C. Manual strike mechanism in accessible location.
   D. Installation in accord with N.F.P.A. 17A code requirements and coordinate with exhaust hood construction and installation.
   E. Four contacts for use by E.C., one contact for alarm, one for supply fan shut-Off, one for shunt trip actuation, and one spare.
   F. Provide mechanical gas solenoid valve loose for installation by plumber.

Approved Manufacturers: Ansul Model R-102, Range Guard, Pyro-chem. ITEMS 41-45 - NOT USED

ITEM 46  HOSE REEL - QUANTITY AS SCHEDULED (2)

Provide open type retractable all-in-one hose reel system having the following features:
   A. B-1434 reel, open, stainless steel.
   B. Continuous pressure type vacuum breaker, B-963.
   C. Shut off control, ORK3.
   D. MV-0522 spray gun.
   E. B-1 31 base faucet.
   F. 50 feet of heavy duty hose.
   G. All chrome interconnecting piping.
   H. Mount on wall at location shown on drawings.
Approved Manufacturers: T&S, or pre-approved equal.
ITEM 47, 48 NOT USED

ITEM 49 ICE MACHINE – (1)

Provide cube ice maker and bin having the following features:
ICE MAKER: ARI certified ice production based on 70° F incoming water and 90° F air
A. ARI Harvest rate minimum of 350 pounds
B. Self-contained, air cooled.
C. Electrical characteristics as scheduled.
D. Manufacturer’s water filtration system
E. Manufacturer's standard finishes.
F. Arrange to make dice cube ice.
BIN:
G. Bin to have minimum 270 pound storage capacity
H. Manufacturer's standard finishes.
I. 6” stainless steel legs.
J. ARI certified and rated in accordance with ARI Standard 820-88
K. NSF listed, UL approved
L. ENERGY STAR CERTIFIED
Mount icemaker on bin and install at location shown on drawings.
Approved Manufacturers: Hoshizaki KML 350MAH, Ice-o-Matic ICE-0400, Manitowoc,
Revised 1-02-07, Revised 11-05-08, Revised 5-15-15

ITEM 50- INGREDIENT BIN DELETE FROM SPECS 5-15-15

ITEMS 51-54 NOT USED

ITEM 55 MIXER, 20 QUART- NOT USED
Revised 10-29-07

ITEM 56-A MIXER, 30 QUART (1)
MIXER AND ACCESSORIES:

1. # 12 attachment hub
2. Removable s/s bowl guard
3. Direct gear driven transmission. ¾ HP motor by manufacturer.
4. Three fixed speeds plus stir speed.
5. Ability to shift gears while machine is operating. Automated soft transition into higher speed
to avoid product splashing out of bowl
6. 15 minute timer
7. Automatic time recall remembers last time set for each speed
8. Ergonomic swing out bowl
9. 115/60/1 voltage, with 6-foot cord and plug.
10. 2 year parts, labor and mileage warranty against manufacturer’s defects.
11. NSF and UL approved
12. Factory trained service technicians available for service.
APPENDICES

13. Powder coat paint
14. Rubber foot pads
15. The motor shall have grease packed ball bearings, ventilation, and splash proof enclosure.
16. Manufacturer provided accessories (no replacement brands): s/s bowl, bowl truck-wire whip, flat beater, dough hook and ingredient chute.

Approved Manufacturer: Hobart HL-300, or pre-approved equal
Revised 10-12-07, Revised 11-20-08, Revised 5-15-15

ITEM 56-B MIXER, 30 QUART DELETE FROM SPECS- 5-15-15

ITEMS 57-63 - NOT USED

ITEM 64 OVEN, CONVECTION, DOUBLE, GAS – (2 SETS)
OVEN, CONVECTION, DOUBLE, NATURAL GAS

Provide with following features:
2 sections, standard depth
_ Stainless steel front, top, and sides. Full metal rear cover
_ Solid stainless steel doors
_ Single porcelain door handle with simultaneous door operation
_ Triple-mounted pressure lock door design with turnbuckle assembly
_ Modular slide out front control panel for easy access & cleaning
_ Fully insulated at top, back, sides and bottom
_ Porcelain baking compartment liner (14 gauge)
_ Five chrome-plated racks, eleven rack positions
_ Two commercial bake oven lamps per compartment
_ Dual Flow Gas system
_ Electronic spark ignition
_ Pressure regulator
_ Manual gas service cut-off switch located on the front of the control panel
_ Air mixers with adjustable air shutters
_ Gas manifold for stacking
_ 48” gas hose with quick disconnect
_ Solid state thermostat with infinite temperature control range of 200°F to 500°F
_ Two speed fan motor
_ 1/3 horsepower blower motor with automatic thermal overload protection
_ Cook/Cool mode selector
_ Control area cooling fan
_ Solid state manual control with separate dials to control thermostat and timer
_ 60 minute timer
_ 6” adjustable stainless steel legs
_ Wired 120 volt with plug and cord attached
_ Two year oven parts and one year labor warranty
_ Five year oven door warranty
_ Replacement parts guaranteed available for 12 years from purchase date
_ NSF, UL or ETL approved
APPLENDES

-- ENERGY STAR CERTIFIED.
    Approved Manufacturers: Blodgett DFG-100-ES, Hobart, Garland MCO-GS-10-ESS
    Revised 07-15-10, Revised 12-1-11, Revised 5-15-15, 7-25-17

ITEM 65  PRE-RINSE UNIT –DECK MOUNTED- (1) INSTALL OVER DISHROOM DISPOSAL

Provide deck mounted pre-rinse unit having the following features:
   A. Flexible stainless steel hose.
   B. Self-closing spray nozzle.
   C. Wall support bracket.
   D. Mixing valve with integral check valves.
Approved Manufacturers: T&S Brass and Bronze Works Model B-113, Chicago Faucet, or
pre-approved equal.

ITEM 66  PRE-RINSE UNIT - INSTALL OVER PREP SINKS AND POTWASHING DISPOSALS
            Delete from specs- Revised 07-15-10

ITEMS 67-68  NOT USED

ITEM 69  RACK, MOBILE POT AND PAN   (2)

Provide four-tier polymer shelving unit complete with tubular uprights and having the following
features:
   A. Uprights shall be nominal 74" high, numbered at one inch intervals.
   B. Shelf connectors to be wedge lock type with corner collar.
   C. Each unit to be free standing.
   D. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to
      be injection molded polypropylene.
   E. Arrange using quantities and sizes as shown on plan drawings.
   F. 800 pound per shelf capacity, minimum.
      Approved Manufacturer: Metro Max Q Series Q556EG2, Eagle Lifestor,
      Revised 10-12-07

ITEM 70  RACK, BUN PANS   (6)
Provide all-welded aluminum pan rack having the following features:
   A. End loading.
   B. Designed for 18” X 26” sheet pans and trays
   C. 3” Spacing between shelves
   B. 350 lb capacity
   C. 5 " diameter swivel casters, with brakes.
   E. Lifetime guarantee against rust
      Preferred Manufacturer: Choice Equipment PRIO-A-1820, Lakeside 8900, Win-Holt AL-
      1820/HD
      Revised 10-12-07, Revised 7-15-10, Revised 7-25-17
ITEM 72  WALK-IN REFRIGERATOR/FREEZER – (1)
Provide pre-fabricated cold storage room assembly of size and shape shown on plan and detail drawings. Exact overall size to be field verified prior to fabrication.

A. Insulation: Panels shall be insulated with 4” thick injected urethane, expanded with R1416, no CFC's used. Foam shall be 2.25 lb. density, 95% closed cell. Panels shall meet ASTM E-84 (UL-723) and be listed by Underwriters laboratories and by Factory Mutual as a Class I building material.

B. Coved corners: Assembly shall be constructed so that all interior wall, floor and ceiling intersections shall comply with N.S.F. requirements.

C. Cam lock fasteners: All panel intersections and wall, floor and ceiling intersections shall be secured by cam lock fasteners.

D. Ceiling panels to be one piece, self-supporting and span full width of assembly.

E. Finishes: Aluminum exterior and interior finishes shall be as shown on drawings.

F. Doors: Door size and finish shall be as shown on drawings, and shall be furnished complete with sill wiper gasket, lift type hinges.

G. Hinges, latches and hardware shall be chrome plated. Minimum (3) hinges.

H. Exterior door to be equipped with automatic door closer.

I. Freezer door to be equipped with perimeter heat.

J. Exterior door(s) to be equipped with cylinder lock having inside safety release feature and also configured to allow use of padlock to secure door.

K. Aluminum kick plate to be provided on door.

L. Thermometers: Each compartment to be provided with exterior flush mounted dial thermometer mounted at eye level to each door.

M. Lights: Each compartment to be furnished complete with manufacturer's standard light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section. Extra lights as needed to provide 30 foot candles 30" above floor.

N. Floor: Quarry Tile

O. The floor and ceiling shall have maximum length panels to span full length of box if possible, otherwise stagger joints so there are no common "four corner" intersections and no joints occurring in doorways.

P. Refrigeration System: Shall be furnished by manufacturer as part of cold storage room assembly, provide each compartment with complete refrigeration system sized to maintain appropriate temperature.

Q. Condensing units to be semi-hermetic, or scroll type, air-cooled, remote. Units to have performance and wiring characteristics as scheduled on drawings. Units shall have pre-wired disconnects. Refrigeration systems to be designed for use with R404A or R507 refrigerant only.

R. Condensing units to be provided with painted galvanized steel all-weather housing, controls, and crankcase heaters, all suitable for outdoor conditions, and located as shown on drawings.
APPENDICES

S. Unit coolers to be low-silhouette type, mounted at locations shown on drawings. Performance and wiring characteristics to be as scheduled on drawings. Freezer system to be provided with timed electric defrost.
T. Evaporator drain lines to be provided by this section and extended to floor receptors outside assembly.
U. Freezer drain lines to be wrapped with heater cable.
V. Refrigerant piping to be ACR copper tubing, hard temper, with wrought fittings and silver solder joints. Insulate suction lines with 3/4″ pre-molded foamed plastic insulation.
W. Ensure bracing of refrigeration line every 7 feet.
X. If bracing is overhead, 12” saddles are required at support.
Y. All insulated portions of refrigerant line to be equal or greater than R-7.1
Z. Refrigeration systems to be provided with all required refrigerant piping, insulation, vibration eliminator, solenoid(s), dryer, suction line filter, expansion valve(s), thermostat(s), heat exchangers, and defrost timers, etc. as necessary for complete installation. Provide pump down control circuit consisting of thermostat and solenoid valve. All components including piping and insulation to be installed using accepted industry standards, manufacturer’s instructions and first class workmanship.
AA. Miscellaneous: Provide 1/8″ diamond tread wainscot along exposed front exterior of assembly mounted from floor to 48″ A.F.F.
BB. Provide trim strips, closure panels, etc., as necessary to trim assembly to adjacent building surfaces.
CC. Provide removable top closure panels with “C” channel rails. Lift-out panel sections to have turndown edges for strength and are not to exceed 4′-0” in length.
DD. Provide plastic strip curtains at door locations, transparent vinyl overlapping strips, aluminum Bar hanging rod and bracket, suitable for low temperature applications, as manufactured by Curtron Flexstrip Products, Inc. or equal.
EE. Provide heated pressure relief port in freezer.
FF. Provide sleeves properly located for utility entrance, drain lines, and refrigeration lines, and after lines are installed, fill sleeves with spray foam compound, suitable for use in refrigerated spaces.
GG. Cold storage room shall be erected by factory trained and certified installers or shall be supervised by factory personnel. Refrigeration systems shall be furnished by cold storage room manufacturer and installed by factory authorized personnel.

ENERGY STAR CERTIFIED

Lights:
Each compartment to be furnished complete with Kason model 1806 LED light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section.

a. Unbreakable lexan jar.
b. Rated 50,000 hr. life.
c. Exceeds Federal Energy Act requirement at 85 lumens/watt.
d. Lamps to be cULus listed, NSF listed and RoHS compliant.
e. Reach full light immediately at lowest temperatures.
f. 5-yr. limited warranty on fixture.
g. 3-yr. limited warranty on lamps.
h. Extra Kason model 1810 4-ft. LED lights as needed to provide 30 foot candles 30″ above floor.
APPENDICES

i. Unbreakable IP-65 polycarbonate enclosure.
k. Rated 50,000 hr. life.
l. 5-yr. limited warranty on fixture.
m. 3-yr. limited warranty on lamps.
n. Reach full light immediately at lowest temperatures.
o. Lamps to be cULus listed, NSF listed and RoHS compliant.

This specification does not constitute a complete description of cold storage assembly, also see plan and detail drawings.

Approved Manufacturers: Bally, Kolpak, Norlake,
Revised 10-29-07, Revised 12-1-11, 7-25-17, 12-18-18

ITEMS 73-75  -  NOT USED

ITEM 76  REFRIGERATOR, REACH-IN  – (1)

Provide two-section reach-in refrigerator with top mounted air-cooled condensing unit, exterior thermometer, cylinder door locks and top mounted condensate evaporator, having the following features:

NOTE: Items 76, 77 and 103 must be provided by same manufacturer.
   A. Full length stainless steel doors, hinged as shown on drawings.
   B. Stainless steel exterior and interior.
   C. 6 stainless steel shelves in each compartment
   D. Set of 5” swivel type locking casters.
   E. Wired for 120/1 operation, cord and plug set.
   F. ENERGY STAR CERTIFIED

Approved Manufacturers: Traulsen RHT132WUT, Victory RS/rsa-2D-S1-Hs/Hg, or pre-approved equal.
Revised 11-20-08, Revised 07-15-10, Revised 5-15-15, Revised 7-25-17

ITEM 77  REFRIGERATOR, PASS-THRU  – (1)

Provide two-section pass-thru refrigerator with top mounted air-cooled condensing unit, exterior dial thermometer, cylinder door locks and top mounted condensate evaporator, having the following features.

NOTE: Items 76, 77 and 103 must be provided by the same manufacturer.
   A. Full length stainless steel doors, hinged as shown on drawings.
   B. Stainless steel exterior and interior.
   C. Removable, universal type stainless steel pan slides, both sections.
   D. Set of adjustable stainless steel legs
   E. Stainless steel banking strip.
   F. Stainless steel trim strip to seal cabinet to all adjacent building surfaces.
   G. Wired for 120/1 operation.
   H. Install cabinet so that controls face kitchen area.
   I. Energy Star Certified
APPENDICES

Approved Manufacturers: Traulsen RHT232WPUT, Victory RS/RSA-2D-S1-PT-HS, Delfield SSR-PT-2,

Revised 11-20-08, Revised 07-15-10, Revised 5-15-15, Revised 7-25-17

ITEMS 78 NOT USED

ITEM 79 SHELVING, REFRIGERATION - QUANTITY AS SCHEDULED

Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
   A. Uprights shall be nominal 74" high, numbered at one inch intervals.
   B. Shelf connectors to be wedge lock type with corner collar.
   C. Each unit to be free standing.
   D. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
   E. Arrange using quantities and sizes as shown on plan drawings.
   F. 800 pound per shelf capacity, minimum.
Approved Manufacturers: Metro-Max Q Series, Eagle Lifstor, Amco Plastic Plus

ITEM 80 SHELVING, DRY STORAGE - QUANTITY AS SCHEDULED

Provide five-tier bright zinc plated wire shelving unit complete with tubular uprights and having the following features:
   A. Electro-zinc plated with chromate bath and clear protective coating.
   B. Uprights shall be nominal 86" high.
   C. Adjustable feet.
   D. Each unit to be free standing.
   E. Arrange using quantities and sizes as shown on Plan Drawings.
Approved Manufacturers: Metro, Eagle, Amco

ITEM 81 NOT USED

This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings.
Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEMS 82, 83 NOT USED

ITEM 84 SINK, POTWASHING SINK – (1)

This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings.
Approved Manufacturers: Select Stainless, Universal, Low Temp Industries
Revised 07-15-10

ITEM 85 NOT USED
ITEM 86  SINK, VEGETABLE, TWO-COMPARTMENT - (1)

This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings.
Approved Manufacturers: Select Stainless, Universal, Low Temp Industries
Revised 07-15-10

ITEM 87  SLICER

Slicer, 12” automatic.
Features to be included:
1. ½ HP motor wired for 120/1 operation, with cord and plug set
2. Adjustable capacity: 12” wide or 7” diameter
3. Adjustable gauge plate up to 1” thickness
4. Stainless steel knife
5. Two speed automatic carriage drive
6. Top mounted removable sharpener with mineral stone
7. All metal finish
8. Lift lever for easy cleaning
9. MICROBAN antimicrobial protection
   Approved Manufacturer: Hobart Model HS7, or pre-approved equal.

ITEM 88  UTENSIL RACK

Provide utensil rack with the following features:
   A. 18 gauge stainless steel shelf.
   B. Stainless steel bar under shelf, mounted to brackets.
   C. Double stainless steel pot hooks approximately 8”o.c.
   D. See detail drawings.
Approved Manufacturers: LowTemp Model SWS-9, or pre-approved equal.

ITEM 89  - NOT USED

ITEM 90  - NOT USED

ITEM 91 STEAMER, CONVECTION - QUANTITY (2)

   A. Two compartment pressure-less floor model steamer
   B. Solid one- piece body for both compartments with heavy duty 14 gauge stainless steel construction for compartment door, interior and exterior walls.
   C. Totally independent cooking compartments with separate gas valve, ignition and water level controls. No shared components between compartments.
   D. Front access generator controls allowing complete service from front of unit
   E. Manual on/off switch which activates automatic fill/drainage via manual ball valve. Electric solenoid switch is not acceptable.
APPENDICES

F. Automatic water fill on start-up
G. Exterior de-liming port
H. Generator de-liming light to alert operator when its time to de-scale
I. Twin high efficiency power burner forced air generators rated at minimum of 72,000 BTU’s per compartment
J. Capacity for ten (10) 12” X 20” X 2 ½” pans.
K. Electronic spark ignition
L. Fan-less high velocity steam distribution system with brass steam jets.
M. Manual 60 minute electro-mechanical timers with load compensating feature and bypass switch for constant steaming.
N. Reversible door gaskets
O. Water filtration system
P. Three year warranty for parts, labor and mileage.
Q. ENERGY STAR CERTIFIED
R. Approved Manufacturers: Cleveland, Model 24-CGA10.2ES, or pre-approved equal.

NOTE: ITEMS # 91, #92 MUST BE PROVIDED BY THE SAME MANUFACTURER
Revised 6-1-06, Revised 11-20-08, Revised 07-15-10

ITEM 92 TRUNNION KETTLES, (1) SINGLE GAS POWERED KETTLE
ITEMS # 92, #91 MUST BE PROVIDED BY THE SAME MANUFACTURER

Provide kettle with following features:
A. One 6-gallon kettle on self-contained modular base.
B. Kettle steam jackets permanently filled with treated distilled water. Venting and/or filling not required.
C. Kettle to be 2/3 steam jacketed, type 304 stainless steel kettle and supports.
D. Manual tilting, balanced design with mounting lugs on both sides, centered pouring lip.
E. 50 PSI steam jacket ration, provided with safety and control valves.
F. Nickel guard coating that resists scale and corrosion.
G. Stainless steel enclosure base with backsplash.
H. Console mounted controls, pressure gauge, illuminated “Start/Reset” control switches.
I. Solid State water level steam generator controls.
J. Electronic spark ignition.
K. Automatic water fill on start-up
L. Automatic generator blow-down.
M. Provide kettle lift-off cover and double pantry faucet.
N. Provide with Secondary Low Water Cut-off per ASME-CSD-1 codes.
O. Five year boiler warranty
Approved Manufacturers: Cleveland Model KGT6, or pre-approved equal.
Revised 5-15-15

ITEM 93 TABLE, WORK, (WITH SINK) - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Table is to include under-shelf and drawer. SINK MUST BE LOCATED AT END OF WORKTABLE.
Approved Manufacturers: Select Stainless, Universal, Low Temp Industries
ITEM 94   TABLE, SOILED DISH - (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEM 95   TABLE, CLEAN DISH – (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEM 96   TABLE, MOBILE - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 60” or 72” long per drawings. Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEM 97   COOK’S, (W/POT RACK AND SINK) – (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Table is to include under-shelf and drawer. Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEM 98   TABLE, WORK - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Table is to include under-shelf and drawer. Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEM 99   TABLE, BAKER - (1)
This item is to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings.

A. 14 gauge 304 stainless one piece, seamless stainless steel top, with 6” high integral riser on back and ends with coved corners. Overall size 30” X 84” long

B. Stainless steel over-shelf, 16-gauge 304 stainless steel, with rear and ends flare up 2”. Height of shelf AFF is 54”

C. Stainless steel legs fitted at top with fully enclosed stainless steel gussets welded to underbracing and at bottom, with adjustable stainless steel bullet feet. Front rail omitted on open base section to allow for ingredient bins.

D. Provide three (3) roller bearing drawers mounted on right side, 20” X 20” X 5”, 18-gauge stainless steel coved corned body, set in stainless steel channel frame and having stainless steel roller slides.
APPENDICES

E. All joints ground and polished to match adjoining surfaces. Sound deaden underside of top.
F. NSF approved.

Approved Manufactures: Select Stainless, Universal Stainless, Low Temp Industries.
Revised 10-29-07, Revised 07-15-10

ITEM 100 TABLE, BEVERAGE (FOR FACULTY) – (1)
Provide modular counter of size and content as shown on plan and detail drawings, having the following features to match Items 9, 12, 15, 17, 30, 31.
A. 36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. 14-gauge stainless steel top with highlighted finish, turndown on all sides and corners fully welded, grounded, and polished.
C. Solid 12" wide, 14-gauge stainless steel, "V" type tray slide on one side mounted at 34" AFF.
D. 4" diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
E. Unit to contain drain trough of 14-gauge stainless steel welded in top and fitted with a removable stainless steel anti-splash grid. Trough to slope to 1” open brass drain and extend to shut off valve located below base. Provide drain pipe to floor drain.
F. Base to have under-storage with shelf and fiberglass door panels with locks.
G. Color: Black.

Approved Manufacturers: Colorpoint Model 60-BT-F, Delfield KCU-60-NU, or pre-approved equal.

Note: Model number given is for 60" long unit.

ITEM 101 VENT DUCT SET
To be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings.

Approved Manufactures: Select Stainless, Universal Stainless, Low Temp Industries.

ITEM 102 WALL SHELF -QUANTITY AS SCHEDULED-MINIMUM ONE OVER WASHER/DRYER
This item to be custom fabricated in accord with General Requirements of specifications and with plan

Approved Manufactures: Select Stainless, Universal Stainless, Low Temp Industries.
Revised 11-25-08

ITEM 103 PASS-THRU HOT CABINET - (2)
Provide one-section pass-through hot cabinet, having the following features.
Note: Items 76, 77 and 103 must be provided by the same manufacturer.
APPENDICES

A. Half-height doors hinged as shown on drawings.
B. Stainless steel exterior and interior.
C. Removable, universal stainless steel pan slides, each half-door section.
D. Voltage characteristics as scheduled.
E. Set of adjustable stainless steel legs
F. Stainless steel trim strip to seal cabinet to all adjacent building surfaces.
G. Install cabinet so controls face kitchen.
H. Top housing to match refrigerator cabinet.
I. Energy Star Certified

Approved Manufacturers: Traulsen RHF132WP, Victory HS/HSA-2D-S1-PT-HS, Delfield SSH-PT-1
Revised 11-20-08, Revised 5-15-15, 7-25-17

ITEM 104 MOBILE HOLDING CABINET/PROOFER – (1)

A. All stainless steel construction, fully insulated cabinet
B. 20 Amp plug with 8’ wire.
C. Maximum 2000 watts, 16 amps
D. Removable universal tray slides to hold 14 bun pans or 28 steam table pans
E. Maintains temperatures from 90° F to 180° F
F. Circulating fan to maintain even temperature throughout cabinet, as well as speed initial warm-up and recovery times
G. External thermometer
H. Dutch doors removable for cleaning, magnetic door latches
I. Bottom mounted water pan with 2 gallon capacity. No exposed heating elements.
J. 5” locking casters
K. UL and NSF approved
L. 5” lockable casters
M. Energy Star Certified

Revised 11-20-08 , Revised 7-25-17

ITEMS 105-117 NOT USED

ITEM 118 STAINLESS STEEL UTILITY CHASE – (1)

Provide island utility chase to serve items under exhaust hood, having the following features:
A. Stainless steel construction.
B. UL label.
C. Designed to include electrical wire way.
D. Water tight electrical receptacles to match equipment.
E. 1 1/2” gas manifold with tees and shut-off valves.
F. 1/2” hot water and cold water manifold with tees and shut-off valves.
G. Gas and water quick disconnects and appropriate cord and plug sets as required by equipment for installation under Division 15 and 16.
H. Manual gas shut-off valve for installation under Division 15.
I. Length as shown on drawings, with utilities coming from above.
APPENDICES

J. Mount switches for pre-starter and hood lights in end riser, approximately 48" above the floor.

K. DesignedbyFoodserviceContractor

Approved Manufacturers: Captive-Aire, Avtec, or pre-approved equal. Revised 12/18/19

ITEM 122 PREP TABLE, MOBILE (2)
This item to be fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 48” long.
Approved Manufacturers: Select Stainless, Universal, Low Temp Industries

ITEM 123 PAPER TOWEL DISPENSER - QUANTITY AS SCHEDULED
Locate directly above the hand sinks in cafeteria areas:
   A. Self-locking.
   B. Holds 2-packages of single-fold towels. C. Stainless steel finish.
Approved manufacturers: A&J Washroom accessories, Model U190, or pre-approved equal

UPON TAKING OCCUPANCY OF CAFETERIA SCHOOL NUTRITION SERVICES IS TO RECEIVE TWO COPIES OF A COMPLETE LIST OF ALL KITCHEN EQUIPMENT, INDICATING THE MANUFACTURER, MODEL AND SERIAL NUMBERS FOR EVERY ITEM.

THIS CONCLUDES ELEMENTARY SCHOOL CAFETERIA EQUIPMENT SPECIFICATIONS
APPENDICES

11.2 K8 Kitchen Equipment (1 of 22)

CHARLOTTE-MECKLENBURG SCHOOLS
CHILD NUTRITION SERVICES
K-8 SCHOOL
KITCHEN EQUIPMENT SPECIFICATIONS
AS OF DECEMBER, 2018

ALL FOODSERVICE EQUIPMENT TO BE NSF AND/OR UL APPROVED WHENEVER APPLICABLE

IF DISCREPANCY EXISTS BETWEEN THE WRITTEN DESCRIPTION AND MODEL NUMBERS, THE WRITTEN DESCRIPTION WILL TAKE PRECEDENCE.

ITEM 1 BEVERAGE MERCHANDISER, QUANTITY (3)
Provide merchandiser with the following features:
- Horizontal bottle cooler with single sliding door
- Forced air cabinet to chill and hold product between 32-38 degrees F
- Maximum dimensions: 36" length, 26 1/2 depth, 34" overall height
- Electrical 115/60/1 pre-wired with 8' cord and plug
- Provide optional stainless steel interior
- Provide optional stainless steel exterior
- Provide optional locking device
- Provide optional swivel casters
- NSF and UL Approved Manufacturer: Beverage Air Model SF-34 or pre-approved equal.

Revised 6-1-06, Revised 11-20-08, Revised 03-01-12

ITEM 2 SPECIALTY DISPLAY CASE - QUANTITY (3)
   A. Merchandiser-Air Curtain
   B. Solid Rear Sliding Access Doors
   C. Stainless steel interior, including Shelves
   D. Two tiered shelves
   E. Air temperature maintained at constant 35-40 degrees F
   F. On-demand PTC condensate evaporator provided for a totally self-contained system.
      A condensate pump is required on the LPRSS5 and LPRSS6.
   G. Clearly visible thermometer to indicate air temperature
   H. Provide optional casters
   I. Provide optional lockable night cover
   J. Light below shelves
   K. Provide optional LED lighting
   L. Unit pre-wired 115 / 60 / 1 for 15 amp dedicated outlet

Approved Manufacturer: Federal Refrigerated Self-Serve Low Profile Specialty Merchandiser, or pre-approved equal.
Revised 10-29-07, Revised 11-21-08, Revised 5-15-15, Revised 7-25-17
APPENDICES

Length-48 inches if schedule provides one display case per line
Length-60 inches if two lines are sharing one display case

ITEM 3 NOT USED

ITEM 4 COUNTER, CORNER, PLAIN TOP - QUANTITY AS SCHEDULED
Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 9, 12, 14, 15, 17, 27
  A. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
  B. Body lined with 18 gauge stainless steel.
  C. Base to have under-storage with shelf and fiberglass door panels with locks.
  D. 30" wide 14 gauge stainless steel top with highlighted finish.
  E. Solid 12" wide, 14 gauge stainless steel, "V" type tray slide, mounted at 30" AFF.
  F. 6" ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
  G. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
  H. Install in banked line-up as shown on drawings.
  I. Color: black.
Approved Manufacturers: Colorpoint Model 36 ST-F, Delfield modified to above specifications, or pre-approved equal. Revised 9-20-18

ITEM 5 BOOSTER HEATER - QUANTITY (1)
Provide compact booster heater having the following features:
  A. Castone, glass lined, or silicone bronze tank, 6 gallon capacity.
  B. Low-water cut-off, temperature/pressure relief valve, pressure reducing valve, temperature/pressure gauge, and shock absorber.
  C. Standard finish body and base.
  D. Electrical characteristics as scheduled.
  E. Under-counter mounting kit.
Approved Manufacturers: Hatco Corporation Model C36, or pre-approved equal.

ITEM 6 NOT USED

ITEM 7 BRAISING PAN GAS - FUTURE
-Provide hood space and utilities for future installation.

Approved Manufacturer: Cleveland SGL-30T1

ITEM 8 PIZZA CART -NOT USED
Revised 10-29-07

ITEM 9 CART, TRAY WITH SILVERWARE & NAPKIN DISPENSERS – QUANTITY (3)
Provide tray and silver cart with the following features to match Items 4, 12, 14, 15, 17, 27
APPENDICES

A. Stainless steel construction.
B. One bottom shelf.
C. Tubular frame.
D. 4” non-marking ball bearing swivel type casters with brakes on all wheels.
E. Silverware container will be molded fiberglass and secured to tray dispenser frame by 1” 16 gauge stainless steel tubing.
F. Napkin holders to be mounted to each side. Dispenser to hold a folded napkin that is 3 ½” wide X 5” high.
G. Standard height for secondary schools.
H. NSF listed

Approved Manufacturers: Colorpoint Model CPM-MTS-MOD, Delfield modified to above specifications, or pre-approved equal.

ITEM 10 - CART, UTILITY, THREE TIER (6)
A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 18” X 32” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers protect walls and furniture
E. 500 lb. capacity per shelf
F. 5” all swivel casters

Approved manufacturer: Choice Equipment UC20-3321-3, Win-Holt UC-3-2133SS, Lakeside 544
Revised 7-19-10, 7-25-17

ITEM 11 CASH REGISTER & COMPUTER/NIC PROVIDED BY OWNER

ITEM 12 CASHIER STAND - QUANTITY (3)
Provide modular counter of size and content as shown on plan and detail drawings, having the following features to match Items 4, 9, 14, 15, 17, 27
36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.

A. 14 gauge stainless steel plain top with highlighted finish, turndown on all sides and corners fully welded, ground, and polished.
B. Solid 12" wide, 14 gauge stainless steel "V" type tray slide for both sides, mounted at 30”.
C. 1" diameter 18-gauge stainless steel foot rest shall be secured to the interior walls.
D. 6” diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels.
E. Provide a 2” diameter ferrule hole with rubber grommet in center top for electrical cords.
F. 18 gauge stainless steel liner
G. Line-up locks on opposing corners.
H. One convenience outlet mounted inside the counter with 115v/15a outlet with 10a breaker.
I. Stainless steel drawer, lockable.
J. A 10” wide fold-down stainless steel shelf is to be mounted at 30” to back of cashiers stand to hold keypad provided by others.
K. Provide a 2” diameter ferrule hole with rubber grommet in back of stand with conduit to feed electrical cords from keypad to convenience outlet located inside of stand.
L. Color: Black

Approved Manufacturers: Colorpoint Model 36-CSE-F, Delfield KCS-36 modified to above specifications, or pre-approved equal.
ITEMS 13 CART, UTILITY, TWO TIER (4)

A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 21” X 33” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers
E. 500 lb. Capacity per shelf
F. Two shelves.
G. 5” all swivel casters

Approved manufacturer: Choice Equipment UC20-3321-2, Win-Holt UC-2-2133SS, Lakeside 543, or pre-approved equal
Revised 10-15-07, Revised 7-19-10, 7-25-17

ITEM 14 COUNTER, BEVERAGE - (1)
Provide modular counter of size and content as shown on plan and detail drawings, having the following features to match Items 4, 9, 12, 15, 17, 27

A. 36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. 14-gauge stainless steel top with highlighted finish, turndown on all sides and corners fully welded, grounded, and polished.
C. Solid 12" wide, 14- gauge stainless steel, "V" type tray slide on one side mounted at 30" AFF.
D. 6” diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels.
   Casters to be mounted with interior and exterior bracing for maximum stress relief.
E. Unit to contain drain trough of 14-gauge stainless steel welded in top and fitted with a removable stainless steel anti-splash grid. Trough to slope to 1” open brass drain and extend to shut off valve located below base.
F. Provide drain pipe to floor drain.
G. Base to have under-storage with shelf and fiberglass door panels with locks.
H. Color: Black.

Note: Model number given is for 74” long unit. Unit is also available in 36”, 50”, 60”, and 96” lengths. Length desired is indicated on plan drawings.
Approved Manufacturers: Colorpoint Model 74-BT-F, Delfield KCU-74-NU modified to above specifications, or pre-approved equal.
Revised 6-1-06, 7-25-17
APPENDICES

ITEM 15  COUNTER, PLAIN TOP QUANTITY (3)
Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 4, 9, 12, 14, 17, and 27

A. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. Body lined with 18 gauge stainless steel.
C. Open base in rear of cabinet.
D. 30" wide 14 gauge stainless steel top with highlighted finish.
E. Solid 12" wide, 14- gauge stainless steel, "V" type tray slide, mounted 30" AFF.
F. Fold down cutting board on server side, to facilitate restocking
G. 6" ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
H. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
I. Install in banked line-up as shown on drawings.
J. Color: Black.

Approved Manufacturers: Colorpoint Model 60-ST-F, Delfield KC-60-NU modified to above specifications, or pre-approved equal.

Revised 10-29-07, Revised 11-25-08, 7-25-17, 9-20-18

ITEM 16  NOT USED

ITEM 17  COUNTER, HOT SERVING - QUANTITY (3)
Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 4, 9, 12, 14, 15, 27

A. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. Body lined with 18-gauge stainless steel.
C. Base to have under-storage with shelf and fiberglass door panels with locks.
D. 30" wide 14-gauge stainless steel top with square turndown on all sides and corners fully welded, ground and polished.
E. Recessed top accept 18" X 26" sheet pans.
F. Five individually controlled dry/moist wells, with solid state digital controls wired to circuit breaker for current overload protection.
G. Control panel to be hinged for service access.
H. Hot food drains for each food well shall be plumbed to common manifold and extended to shut off valve under holding wells. Provide 4’ flexible hose to drain.
I. Solid 10" wide, 14-gauge stainless steel, "V" type tray slide, mounted at 30”.
J. 6" ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
K. 10" shelf on server side, fold down, and 14-gauge stainless steel.
L. Single tier tempered glass over shelf with front tempered glass shield that is adjustable to allow attendant or self-service. Full sloped front protector to prevent customers from touching food. Ends top, and front to be 3/8" tempered glass.
M. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
N. Replacement Panels (5 ea.)
O. All equipment to be built in accordance with Underwriters Laboratories, Inc. and bear the UL complete Unit listing label, no component parts listed equipment will be accepted, and shall also bear the UL listing seal for safety and certification label for sanitation.
P. ELECTRICAL: 208 Volt / 1 phase /Max 2500 Watts
   Plug to be 120V-250V / 50 AMP / Twist Lock/ 4 wire/ Male.
Q. Hatco Glo-Ray Curved Infrared heat strip with LED lights built into the heat strip housing and wired to separate infinite control with on/off switch, and fused as required. Model GR5AL-Black in color.
R. Color: Black
Approved Manufacturers: Colorpoint, Model EF5-CPA-F, Delfield KH-5-NU
Revised 6-1-06, Revised 11-25-08, 7-25-17

ITEM 18 COUNTER, SOLID TOP, FROST TOP - NOT USED
Revised 10-29-07

ITEM 19, 20 NOT USED

ITEM 21 CUTTER, FOOD NOT USED

ITEM 22 DISH CART - QUANTITY (4) PROVIDED BY OWNER

ITEM 23 TRAY DOLLY – QUANTITY (6)
   A. 16 gauge, 304 stainless steel construction
   B. 800 pound rolling capacity
   C. Holds 2 stacks of 12” X 16” cafeteria trays
   D. 1 ¼” lip to securely hold trays
   E. 5” all swivel casters
   F. Lifetime guarantee against rust or corrosion
Approved Manufacturers: Choice Equipment Model UC200-1625, Win-Holt D1625/SS, Lakeside, or pre-approved equal.
Revised 10-05-15

ITEM 24 TROUGH, FLOOR, STAINLESS STEEL - QUANTITY AS SCHEDULED
Provide floor trough with removable grate having the following features:
Grate:
   A. All Stainless steel welded construction.
   B. 3/16” x 1” flat bars set on edge, with 13/16” clearance between bars.
   C. Two 1/2” diameter rods wedged through bars full length, and weld to each bar.
   D. Size to suit trough with removable sections not to exceed 20” long.
Trough
   A. 14 gauge 304 18-8 stainless steel, all welded with coved corners and anchor straps, full perimeter flange for installation under grout.
   B. Pitch to waste and provide stainless steel cup with removable perforated stainless steel basket.
   C. Overall trough size to be approximately 1'-6” wide ~X 2'-0” long.
APPENDICES

D. See plan for clarification. Coordinate with General Contractor and Plumbing Contractor to assure proper installation.

Approved Manufacturers: IMC/Teddy Food Service Corporation Model FT-SG, Serv-o-LifuEastern, or pre-approved equal.

ITEM 25 NOT USED

ITEM 26 DISHMACHINE (1)
Provide gas powered machine with following features:

A. 44” unit
B. Convertible for low temperature or hot water final rinse
C. #16 gauge stainless steel tank and chamber. Provide oversized wash chamber option to accommodate sheet pans in upright position
D. 2 HP machine power wash motor with stainless steel pump and impeller
E. Self-draining pumps
F. 15 KW electric immersion heater, inter-wired at factory. Heater is to have solid state thermostat with positive low water protection.
G. Top mounted dial thermometers mounted in stainless steel enclosure
H. Motor controls wired to common electrical point in stainless steel control center mounted on top of machine. Motors to have built-in thermister overload protection with manual reset.
I. Dual side pawl conveyor driven by 1/6 HP motor.
J. Minimum capacity of 203 racks per hour
K. Ball detent clutch system to prevent damage to conveyor and drive motor if rack should be obstructed.
L. Stainless steel upper and lower wash arms with anti-clog nozzles. Both wash arms to be removable for cleaning without use of tools.
M. Final rinse automatically activated by racks in passing. Rinse agent dispenser injector and electrical interface points. Final rinse rate to be 5.0GPM.
N. Automatic fill with tank water level automatically maintained. Fill to be interrupted if door is opened. Drain handle to be located inside tank chamber and to be closed automatically upon lowering of inspection door.
O. Stainless steel front panel, frame, feet and legs.
P. Energy saaver auto timer
Q. Removable self-flushing stainless steel strainer pans and large deep stainless steel basket removable from front of machine.
R. Door safety interlocks on all doors
S. Pump intake screen assembly
T. Built in integral wiring channel
U. Vent fan control
V. Stainless steel splash shields
W. Plastic strip curtains throughout
X. Conveyor dwell switch
Y. Table limit switch
Z. 2 vent cowls with locking dampers
AA. 4 peg, 2 combinations and 2 bun pan dish racks included
APPENDICES

BB. Machine to have as standard a full two year warranty against manufacturer’s defects on parts, labor, and mileage. Extended 3 year warranty is to be provided making 5 years total coverage.

CC. Energy Star Certified
Approved Manufacturers: Hobart Model CL44E, Champion 44-PRO VHR, Stero
Revised 5-10-04, Revised 10-29-07, Revised 7-19-10, Revised 7-25-17

ITEM 27    DISPENSER, MILK (MUST BE OPEN FRONT) - QUANTITY (3)
Provide mobile carton milk cabinet having the following features:
   A. Stainless steel interior and exterior
   B. Top mounted Removable refrigeration system
   C. Forced air refrigeration system
   D. Sliding lift up and down door(s)
   E. Reinforced cabinet interior bottom. Capacity to hold (12) standard milk cases.
   F. Floor drain with plug
   G. 6” casters
   H. 3 year parts and labor warranty, 5 year compressor parts warranty
   I. Magnetic snap-in EZ clean door gaskets
Approved Manufacture: Traulsen RMC49DR, or pre-approved equal

Revised 6-1-06, 7-25-17

ITEM 28    NOT USED
Revised 10-29-07

ITEM 29 QUANTITY (3)
   A. Horizontal ice cream freezer with glass angled lid
   B. Internal LED lighting
   C. Lid lock with keys
   D. 1 ½” dual swivel casters
   E. Power indicator light
   G. Slide-out, easy access condensing unit
   H. Maintain Temperature -18 to +10 degrees
   J. Three baskets with dividers
   K. External mounted thermometer
   L. 115V/60/1 with 9’ cord and plug attached
Approved Manufacturer: NorLake CTB-43-9 or pre-approved equal
Revised 6-1-06, Revised 10-29-07, Revised 07-15-10, 7-25-17

ITEMS 30, 31    NOT USED

ITEM 32    DISPOSAL, FOOD PREP & POTSINK AREA
Delete From Specs
Revised 7-19-10
APPENDICES

ITEM 33  DUNNAGE RACK - QUANTITY AS SCHEDULED
Provide single deck dunnage platform unit with the following features to match Item 79 or 80.
   A. One piece polymer construction.
   B. Slotted deck.
   C. Arrange as shown on Plan drawings, using quantities and sizes as specified.
Approved Manufacturers: Cambro, Metro, Eagle

ITEM 34  DISPOSAL, DISHWASH AREA  (1)
A. Voltage characteristics as scheduled.
B. 18" diameter stainless steel cone for welding to drain-board.
C. Auto-reversing control center including, magnetic starter(s) and start/stop buttons, in stainless steel NEMA 4 enclosure, or better, with disconnect switch.
D. Thermal overload protection either built into motor or in control center with manual reset.
E. Solenoid and vacuum breaker.
F. Control center to be mounted out of splash zone, under drain board on stainless steel mounting bracket as shown on details.
G. Short neck as necessary to provide clearance under disposal.
H. Coordinate installation of pre-rinse unit (item #65)
I. Low water pressure cutoff, with time delay for water after cut off occurs
J. Permanently lubricated ball bearings
K. Tubular stainless steel legs with bullet feet adjustable to 3 inches in either direction
L. Rubber isolating ring at cone mounting to reduce vibration and noise
M. Air cooled motor.

Approved Manufacturers: Bus Boy Model 3000, Hobart, Insinkerator
Revised 7-20-06, Revised 10-12-07

ITEM 35  DISPLAY CASE, REFRIGERATED, DROP-IN NOT USED
Revised 10-29-07

ITEM 36  NOT USED

ITEM 37  EXHAUST HOOD - QUANTITY (1)
Refer to the most current version of the Division 15 Mechanical & Plumbing Design Guidelines, sections 4.01, A, B & C.

ITEM 38  FAN, AIR CURTAIN  - QUANTITY (1)
Provide air curtain fan having the following features:
   A. #304 stainless steel exterior with adjustable deflectors and adjustable air intake.
   B. Electrical characteristics as scheduled.
   C. Micro-switch for automatic door-actuated on-off control.
   D. 5-year warranty.
Approved Manufacturers: Berner ASR1036A-SS, Mars Door Company Model48CH, Universal Jet Industries,
Revised 6-1-06.
APPENDICES

ITEM 39    EQUIPMENT STAND - FOR ITEM 87    QUANTITY (1)

Approved Manufacturer: HOBART Model 205025, or pre-approved equal
Revised 10-29-07

ITEM 40    FIRE SUPPRESSION SYSTEM - QUANTITY (1)
Provide automatic wet chemical fire control system as required to protect exhaust hood, Item 37, and
the cooking equipment located under this hood, and having the following features:
   A. All tanks, control heads, piping, relays, cable, fusible links, nozzles, elbows, etc., as required
      for complete system.
   B. Brass nozzles and chrome plated or sleeved exposed piping.
   C. Manual strike mechanism in accessible location.
   D. Installation in accord with N.F.P.A. 17A code requirements and coordinate with exhaust hood
      construction and installation.
   E. Four contacts for use by E.C., one contact for alarm, one for supply fan shut-Off, one for
      shunt trip actuation, and one spare.
   F. Provide mechanical gas solenoid valve loose for installation by plumber.

Approved Manufacturers: Ansul Model R-1 02, Range Guard, Pyro-chem

ITEM 41    NOT USED

ITEM 42    FREEZER, REACH-IN, TWO-DOORS - NOT USED
Revised 10-29-07

ITEM 43    NOT USED

ITEM 44    GUIDE RAILINGS - QUANTITY AND LENGTH PER DRAWINGS
Provide guide railings with the following features:
   A. Double horizontal type rail
   B. 14 gauge stainless steel-all welded construction
   C. 2” tubing
   D. 6” radius on end uprights
   E. Die formed flanges with three 3/8” holes for fastening rail to floor
   F. All welds ground and polished to match commercial finish on railing

Approved Manufacturers: United Show Case Company, Inc., or pre-approved equal

ITEM 45    FRYERS NOT USED
Revised 6-01-06

ITEM 46    HOSE REEL - QUANTITY AS SCHEDULED
Provide open type retractable all-in-one hose reel system having the following features:
   A. B-1434 reel, open, stainless steel.
   B. Continuous pressure type vacuum breaker, B-963.
   C. Shut off control, ORK3.
   D. MV-0522 spray gun.
APPENDICES

E. B-1 31 base faucet.
F. 50 feet of heavy duty hose.
G. All chrome interconnecting piping.
H. Mount on wall at location shown on drawings.
Approved Manufacturers: T&S, or pre-approved equal.

ITEMS 47, 48 NOT USED

ITEM 49 ICE MACHINE – (1)
Provide cube ice maker and bin having the following features:
ICE MAKER: ARI certified ice production based on 70°F incoming water and 90°F air
A. ARI Harvest rate minimum of 350 pounds
B. Self-contained, air cooled.
C. Electrical characteristics as scheduled.
D. Water filtration system
E. Manufacturer's standard finishes.
F. Arrange to make dice cube ice.
BIN:
G. Bin to have minimum 270 pound storage capacity
H. Manufacturer's standard finishes.
I. 6" stainless steel legs.
J. ARI certified and rated in accordance with ARI Standard 820-88
K. NSF listed, UL approved
L. ENERGY STAR CERTIFIED
Mount icemaker on bin and install at location shown on drawings.
Approved Manufacturers: Hoshizaki KML 350MAH, Ice-o-Matic ICE-0400, Manitowoc
Revised 1-02-07, Revised 11-05-08, Revised 7-19-10

ITEM 50- INGREDIENT BIN -DELETE FROM SPECS 5-15-15

ITEMS 51-54 NOT USED

ITEM 55 MIXER, 20 QUART NOT USED
Revised 10-29-07

ITEM 56-A MIXER, 30 QUART (1)
MIXER AND ACCESSORIES:
1. # 12 attachment hub
2. Removable s/s bowl guard
3. Direct gear driven transmission. ¾ HP motor by manufacturer.
4. Three fixed speeds plus stir speed.
5. Ability to shift gears while machine is operating. Automated soft transition into higher speed to
   avoid product splashing out of bowl
6. 15 minute timer
7. Automatic time recall remembers last time set for each speed
8. Ergonomic swing out bowl
APPENDICES

9. 115/60/1 voltage, with 6-foot cord and plug.
10. 2 year parts, labor and mileage warranty against manufacturer’s defects.
11. NSF and UL approved
12. Factory trained service technicians available for service.
13. Powder coat paint
14. Rubber foot pads
15. The motor shall have grease packed ball bearings, ventilation, and splash proof enclosure.
16. Manufacturer provided accessories (no replacement brands): s/s bowl, bowl truck-wire whip, flat beater, dough hook and ingredient chute.

Approved Manufacturer: Hobart HL-300, or pre-approved equal
Revised 10-12-07, Revised 11-20-08, Revised 5-15-15

ITEM 56-B MIXER, 30 QUART- DELETE FROM SPECS 5-15-15

ITEMS 57-63 NOT USED

ITEM 64 OVEN, CONVECTION, DOUBLE, GAS – (3 SETS)
OVEN, CONVECTION, DOUBLE, NATURAL GAS
Provide with following features:

2 sections, standard depth
  _ Stainless steel front, top, and sides. Full metal rear cover
  _ Solid stainless steel doors
  _ Single porcelain door handle with simultaneous door operation
  _ Triple-mounted pressure lock door design with turnbuckle assembly
  _ Modular slide out front control panel for easy access & cleaning
  _ Fully insulated at top, back, sides and bottom
  _ Porcelain baking compartment liner (14 gauge)
  _ Five chrome-plated racks, eleven rack positions
  _ Two commercial bake oven lamps per compartment
  _ Dual Flow Gas system
  _ Electronic spark ignition
  _ Pressure regulator
  _ Manual gas service cut-off switch located on the front of the control panel
  _ Air mixers with adjustable air shutters
  _ Gas manifold for stacking
  _ 48” gas hose with quick disconnect
  _ Solid state thermostat with infinite temperature control range of 200°F to 500°F
  _ Two speed fan motor
  _ 1/3 horsepower blower motor with automatic thermal overload protection
  _ Cook/Cool mode selector
  _ Control area cooling fan
  _ Solid state manual control with separate dials to control thermostat and timer
  _ 60 minute timer
  _ 6” adjustable stainless steel legs
  _ Wired 120 volt with plug and cord attached
  _ Two year oven parts and one year labor warranty
APPENDICES

_ Five year oven door warranty
_ Replacement parts guaranteed available for 12 years from purchase date
_ NSF, UL or ETL approved
-- ENERGY STAR CERTIFIED.

Approved Manufacturers: Blodgett DFG-100, Hobart, or pre-approved equal
Revised 07-15-10, Revised 12-01-11, Revised 5-15-15, 7-25-17

ITEM 65   PRE-RINSE UNIT - QUANTITY (1) - INSTALL OVER DISHROOM DISPOSAL
Provide deck mounted pre-rinse unit having the following features:
   A. Flexible stainless steel hose.
   B. Self-closing spray nozzle.
   C. Wall support bracket.
   D. Mixing valve with integral check valves.
Approved Manufacturers: T&S Model B-113, or pre-approved equal.

ITEM 66   PRE-RINSE UNIT
Delete from specs.
Revised 7-19-10

ITEMS 67-68  NOT USED

ITEM 69   RACK, MOBILE POT AND PAN   (3)
Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
A. Uprights shall be nominal 74" high, numbered at one inch intervals.
B. Shelf connectors to be wedge lock type with corner collar.
C. Each unit to be free standing.
D. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
E. Arrange using quantities and sizes as shown on plan drawings.
F. 800 pound per shelf capacity, minimum.
Preferred Manufacturer: Metro Max Q Series Q556EG2, Eagle Lifestor, Amco Plastic Plus
Revised 10-12-07

ITEM 70   RACK, BUN PANS   (6)
Provide all-welded aluminum pan rack having the following features:
A. End loading.
B. Designed for 18” X 26” pans and trays.
3” spacing between shelves
C. 350 lb capacity
D. 5" diameter swivel casters, with brakes.
E. Lifetime guarantee against rust
Revised 10-12-07, Revised 7-19-10, 7-25-17
APPENDICES

ITEM 71  NOT USED

ITEM 72  WALK-IN REFRIGERATOR/FREEZER

Provide pre-fabricated cold storage room assembly of size and shape shown on plan and detail drawings. Exact overall size to be field verified prior to fabrication.

A. Insulation: Panels shall be insulated with 4” thick injected urethane, expanded with R1416, no CFC’s used. Foam shall be 2.25 lb. density, 95% closed cell. Panels shall meet ASTM-E84 (UL-723) and be listed by Underwriters laboratories and by Factory Mutual as a Class I building material.

B. Coved corners: Assembly shall be constructed so that all interior wall, floor and ceiling intersections shall comply with N.S.F. requirements.

C. Cam lock fasteners: All panel intersections and wall, floor and ceiling intersections shall be secured by cam lock fasteners.

D. Ceiling panels to be one piece, self-supporting and span full width of assembly.

E. Finishes: Aluminum exterior and interior finishes shall be as shown on drawings.

F. Doors: Door size and finish shall be as shown on drawings, and shall be furnished complete with sill wiper gasket, lift type hinges.

G. Hinges, latches and hardware shall be chrome plated. Minimum (3) hinges.

H. Exterior door to be equipped with automatic door closer.

I. Freezer door to be equipped with perimeter heat.

J. Exterior door(s) to be equipped with cylinder lock having inside safety release feature and also configured to allow use of padlock to secure door.

K. Aluminum kick plate to be provided on door.

L. Thermometers: Each compartment to be provided with exterior flush mounted dial thermometer mounted at eye level to each door.

M. Lights: Each compartment to be furnished complete with manufacturer's standard light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section. Extra lights as needed to provide 30 foot candles 30" above floor.

N. Floor: Quarry Tile

O. The floor and ceiling shall have maximum length panels to span full length of box if possible, otherwise stagger joints so there are no common "four corner" intersections and no joints occurring in doorways.

P. Refrigeration System: Shall be furnished by manufacturer as part of cold storage room assembly, provide each compartment with complete refrigeration system sized to maintain appropriate temperature.

Q. Condensing units to be semi-hermetic, or scroll type, air-cooled, remote. Units to have performance and wiring characteristics as scheduled on drawings. Units shall have pre-wired disconnects. Refrigeration systems to be designed for use with R404A or R507 refrigerant only.

R. Condensing units to be provided with painted galvanized steel all-weather housing, controls, and crankcase heaters, all suitable for outdoor conditions, and located as shown on drawings.

S. Unit coolers to be low-silhouette type, mounted at locations shown on drawings. Performance and wiring characteristics to be as scheduled on drawings. Freezer system to be provided with timed electric defrost.

T. Evaporator drain lines to be provided by this section and extended to floor receptors outside assembly.

U. Freezer drain lines to be wrapped with heater cable.
APPENDICES

V. Refrigerant piping to be ACR copper tubing, hard temper, with wrought fittings and silver solder joints. Insulate suction lines with 3/4" pre-molded foamed plastic insulation.
W. Ensure bracing of refrigeration line every 7 feet.
X. If bracing is overhead, 12" saddles are required at support
Y. All insulated portions of refrigerant line to be equal or greater than R-7.1
Z. Refrigeration systems to be provided with all required refrigerant piping, insulation, vibration eliminator, solenoid(s), dryer, suction line filter, expansion valve(s), thermostat(s), heat exchangers, and defrost timers, etc. as necessary for complete installation. Provide pump down control circuit consisting of thermostat and solenoid valve. All components including piping and insulation to be installed using accepted industry standards, manufacturer’s instructions and first class workmanship.

AA. Miscellaneous: Provide 1/8" diamond tread wainscot along exposed front exterior of assembly mounted from floor to 48" A.F.F.
BB. Provide trim strips, closure panels, etc., as necessary to trim assembly to adjacent building surfaces.
CC. Provide removable top closure panels with “C” channel rails. Lift-out panel sections to have turndown edges for strength and are not to exceed 4’-0” in length.
DD. Provide plastic strip curtains at door locations, transparent vinyl overlapping strips, aluminum Bar hanging rod and bracket, suitable for low temperature applications, as manufactured by Curtron Flexstrip Products, Inc. or equal.
EE. Provide heated pressure relief port in freezer.
FF. Provide sleeves properly located for utility entrance, drain lines, and refrigeration lines, and after lines are installed, fill sleeves with spray foam compound, suitable for use in refrigerated spaces.
GG. Cold storage room shall be erected by factory trained and certified installers or shall be supervised by factory personnel. Refrigeration systems shall be furnished by cold storage room manufacturer and installed by factory authorized personnel.

ENERGY STAR CERTIFIED

Lights:
Each compartment to be furnished complete with Kason model 1806 LED light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section.

a. Unbreakable lexan jar.
b. Rated 50,000 hr. life.
c. Exceeds Federal Energy Act requirement at 85 lumens/watt.
d. Lamps to be cULus listed, NSF listed and RoHS compliant.
e. Reach full light immediately at lowest temperatures.
f. 5-yr. limited warranty on fixture.
g. 3-yr. limited warranty on lamps.
h. Extra Kason model 1810 4-ft. LED lights as needed to provide 30 foot candles 30” above floor.
i. Unbreakable IP-65 polycarbonate enclosure.
k. Rated 50,000 hr. life.
l. 5-yr. limited warranty on fixture.
m. 3-yr. limited warranty on lamps.
n. Reach full light immediately at lowest temperatures.
o. Lamps to be cULus listed, NSF listed and RoHS compliant.
APPENDICES

Revised 6-1-06, Revised 07-15-10, Revised 12-1-11, 7-25-17, 5-3-18

ITEMS 73-75 NOT USED

ITEM 76  REFRIGERATOR, REACH-IN - QUANTITY (1)
Provide two-section reach-in refrigerator with top mounted air-cooled condensing unit, exterior thermometer, cylinder door locks and top mounted condensate evaporator, having the following features:
   A. Full length stainless steel doors, hinged as shown on drawings.
   B. Stainless steel exterior and interior.
   C. 6 stainless steel shelves in each compartment
   D. Set of 5” swivel- type locking casters.
   E. Wired for 120/1 operation, cord and plug set.
   F. Energy Star Certified
Preferred Manufacturer:  Traulsen RHT232WUT, Victory RS/RSA-2D-S1-HS/HG, Delfield SSR-2-S,
Note: 76, 77 and 103 must be provided by same manufacturer.
Revised 6-1-06, Revised 11-20-08, Revised 7-15-10, Revised 5-15-15, Revised 7-25-17

ITEM 77  REFRIGERATOR, PASS-THRU - QUANTITY AS SCHEDULED
Provide two-section pass-thru refrigerator with top mounted air-cooled condensing unit, exterior dial thermometer, cylinder door locks and top mounted condensate evaporator, having the following features.
   A. Full length stainless steel doors, hinged as shown on drawings.
   B. Stainless steel exterior and interior.
   C. Removable, universal type stainless steel pan slides, both sections.
   D. Set of adjustable stainless steel legs
   E. Stainless steel banking strip.
   F. Customized stainless steel trim strip to seal cabinet to adjacent interior and exterior building surfaces.
   G. Wired for 120/1 operation.
   H. Install cabinet so that controls face kitchen area.
   I. Energy Star Certified
Approved Manufacturers:  Traulsen RHT232WPUT, Victory RS/RSA-2D-S1-PT-HS, Delfield SSR-PT-2
Note: items 76, 77 and 103 must be provided by the same manufacturer.
Revised 6-1-06, Revised 11-20-08, Revised 07-15-10, Revised 5-15-15, 7-25-17

ITEM 78  NOT USED

ITEM 79  SHELVING, REFRIGERATION - QUANTITY AS SCHEDULED
Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
Uprights shall be nominal 74” high, numbered at one inch intervals.
   A. Shelf connectors to be wedge lock type with corner collar.
   B. Each unit to be free standing.
APPENDICES

C. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
D. Arrange using quantities and sizes as shown on plan drawings.
E. 800 pound per shelf capacity, minimum.

ITEM 80  SHELVING, DRY STORAGE - QUANTITY AS SCHEDULED
Provide five-tier bright zinc plated wire shelving unit complete with tubular uprights and having the following features:
A. Electro-zinc plated with chromate bath and clear protective coating.
B. Uprights shall be nominal 86" high.
C. Adjustable feet.
D. Arrange using quantities and sizes as shown on Plan Drawings.
Approved Manufacturers: Metro, Eagle, Amco

ITEM 81  SILVERWARE CHUTE – NOT USED
Revised 10-29-07

ITEMS 82, 83 NOT USED

ITEM 84  SINK, POTWASHING - QUANTITY AS SCHEDULED
This item to be custom-fabricated in accord with General Requirements of specifications and with plan and detail drawings. Include disposal (#32) and pre-rinse (#66).
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 85  SINK, SILVER SOAK - NOT USED
Revised 10-29-07

ITEM 86  SINK, VEGETABLE, TWO-COMPARTMENT - QUANTITY (1)
This item to be custom-fabricated in accord with General Requirements of specifications and with plan and detail drawings. Include disposal (#32) and pre-rinse unit (#66).
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 87  SLICER
Slicer, 12” automatic.
Features to be included:
1. ½ HP motor wired for 120/1 operation, with cord and plug set
2. Adjustable capacity: 12” wide or 7” diameter
3. Adjustable gauge plate up to 1” thickness
4. Stainless steel knife
5. Two speed automatic carriage drive
6. Top mounted removable sharpener with mineral stone
7. All metal finish
8. Lift lever for easy cleaning
9. MICROBAN antimicrobial protection
Approved Manufacturer: Hobart Model HS7, or pre-approved equal
APPENDICES

Updated 7-25-17

ITEM 88  UTENSIL RACK
Provide utensil rack with the following features:
   A. 18 gauge stainless steel shelf.
   B. Stainless steel bar under shelf, mounted to brackets.
   C. Double stainless steel pot hooks approximately 8”o.c.
   D. See detail drawings.
Approved Manufacturers: Select Stainless, LowTemp Model SWS-9, Universal Stainless

ITEM 89  NOT USED

ITEM 90  COMBI OVENS  NOT USED
Revised 6-01-06

ITEM 91 STEAMER, CONVECTION - QUANTITY (2)
   A. Two compartment pressure-less floor model steamer
   B. Solid one-piece body for both compartments with heavy duty 14 gauge stainless steel construction for compartment door, interior and exterior walls.
   C. Totally independent cooking compartments with separate gas valve, ignition and water level controls. No shared components between compartments.
   D. Front access generator controls allowing complete service from front of unit
   E. Manual on/off switch which activates automatic fill/drainage via manual ball valve. Electric solenoid switch is not acceptable.
   F. Automatic water fill on start-up
   G. Exterior de-liming port
   H. Generator de-liming light to alert operator when it is time to de-scale
   I. Twin high efficiency power burner forced air generators rated at minimum of 72,000 BTU’s per compartment
   J. Capacity for ten (10) 12” X 20” X 2 ½” pans.
   K. Electronic spark ignition
   L. Fan-less high velocity steam distribution system with brass steam jets.
   M. Manual 60 minute electro-mechanical timers with load compensating feature and bypass switch for constant steaming.
   N. Reversible door gaskets
   O. Water filtration system
   P. Three year warranty for parts, labor and mileage.
   Q. Approved Manufacturers: Cleveland, Model 24-CGA10.2ES, or pre-approved equal.
NOTE: ITEMS #91, #92 MUST BE PROVIDED BY THE SAME MANUFACTURER
Revised 6-1-06, Revised 11-20-08

ITEM 92  TRUNNION KETTLE, SINGLE, GAS - QUANTITY – (1)
Provide kettles with following features:
   A. One 6-gallon kettle on self-contained modular base with drain trough.
APPENDICES

B. Kettle steam jacket permanently filled with treated distilled water. Venting and/or refilling not required.
C. Kettle to be 2/3 steam jacketed, type 304 stainless steel kettle and supports.
D. Manual tilting, balanced design with mounting lugs on both sides, centered pouring lip.
E. 50 PSI steam jacket ration, provided with safety and control valves.
F. Nickel-guard coating that resists scale and corrosion.
G. Stainless steel enclosure base with backsplash.
H. Console mounted controls, pressure gauge, illuminated “Start/Reset” control switches.
I. Solid State water level steam generator controls.
J. Electronic spark ignition.
K. Automatic water fill on start-up
L. Automatic generator blow-down.
M. Provide kettle lift-off cover and double pantry faucet.
N. Provide with Secondary Low Water Cut-off per ASME-CSD-1 codes.
O. 5-year boiler warranty

Approved Manufacturers: Cleveland Model KGT-6, or pre-approved equal.

ITEM # 92, #91 MUST BE PROVIDED BY SAME MANUFACTURER
Revised 6-1-06, Revised 5-15-15

ITEM 93  TABLE, WORK (WITH SINK) - QUANTITY (1) - BAKING AREA
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Table is to include under-shelf and drawer. SINK MUST BE LOCATED AT END OF TABLE.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 94  TABLE, SOILED DISH - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 95  TABLE, CLEAN DISH - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 96  TABLE, PORTABLE - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 60” or 72” long, per drawings.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 97  TABLE, COOK’S (W/POT RACK AND SINK) - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer and under-shelf.

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 98  TABLE, WORK - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer and under-shelf.

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 99  TABLE, BAKER - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specs and with plan and detail drawings.

A. 14 gauge 304 stainless one piece, seamless stainless steel top, with 6” high integral riser on back and ends with coved corners. Overall size 30” X 84” long.
B. Stainless steel over-shelf, 16-gauge 304 stainless steel, with rear and ends flare up 2”. Height of shelf AFF is 74”.
C. Stainless steel legs fitted at top with fully enclosed stainless steel gussets welded to underbracing and at bottom, with adjustable stainless steel bullet feet. Front rail omitted on open base section to allow for ingredient bins.
D. Provide three (3) roller bearing drawers mounted on right side, 20” X 20” X 5”, 18-gauge stainless steel coved corned body, set in stainless steel channel frame and having stainless steel roller sides.
E. All joints ground and polished to match adjoining surfaces. Sound deaden underside of top.
F. NSF approved.

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
Revised 6-01-06, Revised 10-29-07, Revised 07-15-10

ITEM 100  NOT USED

ITEM 101  VENT DUCT SET - QUANTITY (1)
To be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings.

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 102  WALL SHELF - QUANTITY AS SCHEDULED-MINIMUM (1) OVER WASHER AND DRYER
This item to be custom fabricated in accord with General Requirements of specifications and with plan

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
Revised 11-28-08

ITEM 103  WARMING CABINET, PASS THRU - QUANTITY AS SCHEDULED
Provide one-section pass-through hot cabinet, having the following features. Note: items 76, 77, and 103 must be provided by the same manufacturer.
APPENDICES

A. Half-height doors hinged as shown on drawings.  
B. Stainless steel exterior and interior.  
C. Removable, universal stainless steel pan slides, each half-door section.  
D. Voltage characteristics as scheduled.  
E. Set of adjustable stainless steel legs  
F. Customized stainless steel trim strip to seal cabinet to adjacent interior and exterior building surfaces.  
G. Install cabinet so controls face kitchen.  
H. Top housing to match refrigerator cabinet.  
I. Energy Star Certified  

Approved Manufacturers: Traulsen RHF132WP, Victory, Delfield SSH-PT-1  
Revised 6-1-06, Revised 11-20-08, Revised 7-15-10, Revised 5-15-15

ITEM 104  WARMER CABINET/PROOFER, MOBILE - QUANTITY (1)  
Provide mobile heater/proothing cabinet having the following features:  
A. All stainless steel construction  
B. 20 Amp plug with 8’ wire.  
C. Universal Tray Slides to hold 14 bun pans or 28 steam table pans  
D. Maintains temperatures from 85° F to 180° F  
E. Circulating fan to maintain even temperature throughout cabinet, as well as speed initial warm-up and recovery times  
F. External thermometer  
G. Dutch Doors  
H. Bottom mounted water pan  
I. 5” locking casters  
J. Energy Star Certified  

Approved Manufacturers: Winston HA4522-5, Traulsen RHF132W-FHS, Altoshaam, Wilder  
Revised 11-20-08

ITEMS 105-117  NOT USED

ITEM 118  STAINLESS STEEL UTILITY CHASE - (1)  
Provide island utility chase to serve items under exhaust hood, having the following features:  
A. Stainless steel construction.  
B. UL label.  
C. Designed to include electrical wire way.  
D. Water tight electrical receptacles to match equipment.  
E. 1 1/2” gas manifold with tees and shut-off valves.  
F. 1/2” hot water and cold water manifold with tees and shut-off valves.  
G. Gas and water quick disconnects and appropriate cord and plug sets as required by equipment for installation under Division 15 and 16.  
H. Manual gas shut-off valve for installation under Division 15.  
I. Length as shown on drawings, with utilities coming from above.  
J. Designed by Foodservice Contractor  
K. Mount switches for pre-starter and hood lights in end riser, approximately 48” above the floor. Approved Manufacturers: Captive-Aire, Avtec Model ILUW, , or pre-approved equal.

ITEM 122  PREP TABLE, MOBILE (2)
APPENDICES

This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 48” long.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
Revised 10-29-07

ITEM 123 PAPER TOWEL DISPENSER - QUANTITY AS SCHEDULED Locate directly above the hand sinks in cafeteria areas:
   A. Self-locking.
   B. Holds 2-packages of single-fold towels. C. Stainless steel finish.
Approved manufacturers: A&J Washroom Accessories Model # U190, or pre-approved equal
Revised 6-1-06.

UPON TAKING OCCUPANCY OF CAFETERIA CHILD NUTRITION SERVICES IS TO RECEIVE TWO COPIES OF A COMPLETE LIST OF ALL KITCHEN EQUIPMENT, INDICATING THE MANUFACTURER, MODEL AND SERIAL NUMBERS FOR EVERY ITEM.

THIS CONCLUDES K8 SCHOOL CAFETERIA EQUIPMENT SPECIFICATIONS
APPENDICES

11.3 MS Kitchen Equipment (1 of 21)

CHARLOTTE-MECKLENBURG SCHOOLS
CHILD NUTRITION SERVICES
MIDDLE SCHOOL
KITCHEN EQUIPMENT SPECIFICATIONS
AS OF JULY, 2017

ALL FOODSERVICE EQUIPMENT TO BE NSF AND/OR UL APPROVED WHENEVER APPLICABLE

IF DISCREPANCY EXISTS BETWEEN THE WRITTEN DESCRIPTION AND MODEL NUMBERS, THE WRITTEN DESCRIPTION WILL TAKE PRECEDENCE.

ITEM 1 BEVERAGE MERCHANDISER, QUANTITY (3)
Provide merchandiser with the following features:
- Horizontal bottle cooler with single sliding door
- Forced air cabinet to chill and hold product between 32-38 degrees F
- Maximum dimensions: 36" length, 26 1/2 depth, 34" overall height
- Electrical 115/60/1 pre-wired with 8' cord and plug
- Provide optional stainless steel interior
- Provide optional stainless steel exterior
- Provide optional locking device
- Provide optional swivel casters
- NSF and UL Approved Manufacturer: Beverage Air Model SF-34 or pre-approved equal.

Revised 6-1-06, Revised 11-20-08, Revised 03-01-12

ITEM 2 SPECIALTY DISPLAY CASE - QUANTITY (3)
A. Merchandiser-Air Curtain
B. Solid Rear Sliding Access Doors
C. Stainless steel interior, including Shelves
D. Two tiered shelves
E. Air temperature maintained at constant 35-40 degrees F
F. On-demand PTC condensate evaporator provided for a totally self-contained system.
   A condensate pump is required on the LPRSS5 and LPRSS6.
G. Clearly visible thermometer to indicate air temperature
H. Provide optional casters
I. Provide optional lockable night cover
J. Light below shelves
K. Provide optional LED lighting
L. Unit pre-wired 115 / 60 / 1 for 15 amp dedicated outlet

Approved Manufacturer: Federal Refrigerated Self-Serve Low Profile Specialty Merchandiser
Revised 10-29-07, Revised 11-21-08, Revised 5-15-15, Revised 7-25-17
Length 48 inches if schedule provides one display case per line
Length- 60 inches if two lines are sharing one display case
APPENDICES

ITEM 3  NOT USED

ITEM 4  COUNTER, CORNER, PLAIN TOP - QUANTITY AS SCHEDULED
Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 9, 12, 14, 15, 17, 27
A. 36" high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. Body lined with 18 gauge stainless steel.
C. Base to have under-storage with shelf and fiberglass door panels with locks.
D. 30” wide 14 gauge stainless steel top with highlighted finish.
E. Solid 12" wide, 14 gauge stainless steel, "V" type tray slide, mounted at 34" AFF.
F. 4" ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
G. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
H. Install in banked line-up as shown on drawings.
I. Color: black.
Approved Manufacturers: Colorpoint Model 36 ST-F, Delfield modified to above specifications, or pre-approved equal.

ITEM 5  Booster Heater - Quantity (1)
Provide compact booster heater having the following features:
A. Castone, glass lined, or silicone bronze tank, 6 gallon capacity.
B. Low-water cut-off, temperature/pressure relief valve, pressure reducing valve, temperature/pressure gauge, and shock absorber.
C. Standard finish body and base.
D. Electrical characteristics as scheduled.
E. Under-counter mounting kit.
Approved Manufacturers: Hatco Corporation Model C36, or pre-approved equal.

ITEM 6  NOT USED

ITEM 7  Braising Pan Gas - Future
- Provide hood space and utilities for future Installation.

Approved Manufacturer: Cleveland SGL-30T1

ITEM 8  Pizza Cart - NOT USED
Revised 10-29-07

ITEM 9  Cart, Tray with Silverware & Napkin Dispensers – Quantity (6)
Provide tray and silver cart with the following features to match Items 4, 12, 14, 15, 17, 27
A. Stainless steel construction.
B. One bottom shelf.
C. Tubular frame.
D. 4” non-marking ball bearing swivel type casters with brakes on all wheels.
APPENDICES

E. Silverware container will be molded fiberglass and secured to tray dispenser frame by 1” 16 gauge stainless steel tubing.
F. Napkin holders to be mounted to each side. Dispenser to hold a folded napkin that is 3 ½” wide X 5” high.
G. Standard height for secondary schools.
H. NSF listed

Approved Manufacturers: Colorpoint Model CPM-MTS-MOD, Delfield modified to above specifications, or pre-approved equal.

ITEM 10 - CART, UTILITY, THREE TIER (6)
A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 18” X 32” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers protect walls and furniture
E. 500 lb. capacity per shelf
F. 5” all swivel casters

Approved manufacturer: Choice Equipment UC20-3321-3, Win-Holt UC-3-2133SS, Lakeside 544
Revised 7-19-10, 7-25-17

ITEM 11 CASH REGISTERS & COMPUTER /NIC PROVIDED BY OWNER

ITEM 12 CASHIER STAND - QUANTITY (3)
Provide modular counter of size and content as shown on plan and detail drawings, having the following features to match Items 4, 9, 14, 15, 17, 27
36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.

A. 14 gauge stainless steel plain top with highlighted finish, turndown on all sides and corners fully welded, ground, and polished.
B. Solid 12” wide, 14 gauge stainless steel "V" type tray slide for both sides, mounted at 34”.
C. 1” diameter 18-gauge stainless steel foot rest shall be secured to the interior walls.
D. 4” diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels.
E. Provide a 2” diameter ferrule hole with rubber grommet in center top for electrical cords.
F. 18 gauge stainless steel liner
G. Line-up locks on opposing corners.
H. One convenience outlet mounted inside the counter with 115v/15a outlet with 10a breaker.
I. Stainless steel drawer, lockable.
J. A 10” wide fold-down stainless steel shelf is to be mounted at 34” to back of cashiers stand to hold keypad provided by others.
K. Provide a 2” diameter ferrule hole with rubber grommet in back of stand with conduit to feed electrical cords from keypad to convenience outlet located inside of stand.

Approved Manufacturers: Colorpoint Model 36-CSE-F, Delfield KCS-36 modified to above specifications, or pre-approved equal.
ITEM 13 CART, UTILITY, TWO TIER (4)

A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 21” X 33” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers
E. 500 lb. Capacity per shelf
F. Two shelves.
G. 5” all swivel casters

Approved manufacturer: Choice Equipment UC20-3321-2, Win-Holt UC-2-2133SS, Lakeside 543, or pre-approved equal

Revised 10-15-07, Revised 7-19-10, 7-25-17

ITEM 14 COUNTER, BEVERAGE - (1)

Provide modular counter of size and content as shown on plan and detail drawings, having the following features to match Items 4, 9, 12, 15, 17, 27

A. 36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. 14-gauge stainless steel top with highlighted finish, turndown on all sides and corners fully welded, grounded, and polished.
C. Solid 12" wide, 14-gauge stainless steel, "V" type tray slide on one side mounted at 34" AFF.
D. 4” diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
E. Unit to contain drain trough of 14-gauge stainless steel welded in top and fitted with a removable stainless steel anti-splash grid. Trough to slope to 1” open brass drain and extend to shut off valve located below base.
F. Provide drain pipe to floor drain.
G. Base to have under-storage with shelf and fiberglass door panels with locks.
H. Color: Black.

Note: Model number given is for 74” long unit. Unit is also available in 36", 50", 60", and 96" lengths. Length desired is indicated on plan drawings.

Approved Manufacturers: Colorpoint Model 74-BT-F, Delfield KCU-74-NU modified to above specifications, or pre-approved equal.

Revised 6-1-06, 7-25-17

ITEM 15 COUNTER, PLAIN TOP QUANTITY (3)

Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 4, 9, 12, 14, 17, and 27

A. 36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.
B. Body lined with 18 gauge stainless steel.
C. Open base in rear of cabinet.
D. 30” wide 14 gauge stainless steel top with highlighted finish.
APPENDICES

E. Two tier display stand 48” X 28” shall have uprights constructed of 1¼” square stainless steel tubing with stainless cap and base. Shelves to be ¼” polished glass resting on a horizontal stainless steel framework welded to the uprights. The display stand is to be enclosed on ends with ¼” polished glass. Front sneeze guard to be 1/4” polished glass mounted on adjustable stainless steel brackets. Glass to be bound in 1/4” stainless steel channel to prevent chipping and breaking. Total height of unit shall not exceed 60”

F. Solid 12” wide, 14- gauge stainless steel, "V" type tray slide, mounted 34” AFF.

G. Fold down cutting board on server side, to facilitate restocking

H. 4” ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.

I. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.

J. Install in banked line-up as shown on drawings.

K. Color: Black.

Approved Manufacturers: Colorpoint Model 60-ST-F, Delfield KC-60-NU modified to above specifications, or pre-approved equal.

Revised 10-29-07, Revised 11-25-08, 7-25-17

ITEM 16  NOT USED

ITEM 17  COUNTER, HOT SERVING - QUANTITY (3)

Provide modular serving counter of size and content as shown on plan drawings, having the following features to match Items 4, 9, 12, 14, 15, 27

A. 36” high basic counter section with seamless molded fiberglass body, flame retardant per ASTM E162 and flame spread of 25 or less.

B. Body lined with 18-gauge stainless steel.

C. Base to have under-storage with shelf and fibreglass door panels with locks.

D. 30” wide 14-gauge stainless steel top with square turndown on all sides and corners fully welded, ground and polished.

E. Recessed top accept 18" X 26” sheet pans.

F. Five individually controlled dry/moist wells, with solid state digital controls wired to circuit breaker for current overload protection.

G. Control panel to be hinged for service access.

H. Hot food drains for each food well shall be plumbed to common manifold and extended to shut off valve under holding wells. Provide 4’ flexible hose to drain.

I. Solid 10” wide, 14-gauge stainless steel, "V" type tray slide, mounted at 34”.

J. 5” ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.

K. 10” shelf on server side, fold down, and 14-gauge stainless steel.

L. Single tier tempered glass over shelf with front tempered glass shield that is adjustable to allow attendant or self-service. Full sloped front protector to prevent customers from touching food. Ends top, and front to be 3/8” tempered glass.

M. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
APPENDICES

N. Replacement Panels (5 ea.)
O. All equipment to be built in accordance with Underwriters Laboratories, Inc. and bear the UL complete Unit listing label, no component parts listed equipment will be accepted, and shall also bear the UL listing seal for safety and certification label for sanitation.
P. ELECTRICAL: 208 Volt / 1 phase /Max 2500 Watts
   Plug to be 120V-250V / 50 AMP / Twist Lock/ 4 wire/ Male.
Q. Hatco Glo-Ray Curved Infrared heat strip with LED lights built into the heat strip housing and wired to separate infinite control with on/off switch, and fused as required. Model GR5AL-Black in color.
R. Color: Black
   Approved Manufacturers: Colorpoint, Model EF5-CPA-F, Delfield KH-5-NU
   Revised 6-1-06, Revised 11-25-08, 7-25-17

ITEM 18 COUNTER, SOLID TOP, FROST TOP - NOT USED
   Revised 10-29-07

ITEM 19, 20 NOT USED

ITEM 21 CUTTER, FOOD NOT USED

ITEM 22 DISH CART - QUANTITY (4) PROVIDED BY OWNER

ITEM 23 TRAY DOLLY – QUANTITY (6)
   A. 16 gauge, 304 stainless steel construction
   B. 800 pound rolling capacity
   C. Holds 2 stacks of 12" X 16" cafeteria trays
   D. 1 ¼" lip to securely hold trays
   E. 5” all swivel casters
   F. Lifetime guarantee against rust or corrosion
   Approved Manufacturers: Choice Equipment Model UC200-1625, Win-Holt D1625/SS, Lakeside, or pre-approved equal.
   Revised 10-05-15

ITEM 24 TROUGH, FLOOR, STAINLESS STEEL - QUANTITY AS SCHEDULED
   Provide floor trough with removable grate having the following features:
   Grate:
   A. All Stainless steel welded construction.
   B. 3/16" x 1” flat bars set on edge, with 13/16" clearance between bars.
   C. Two 1/2" diameter rods wedged through bars full length, and weld to each bar.
   D. Size to suit trough with removable sections not to exceed 20" long.
   Trough
   A. 14 gauge 304 18-8 stainless steel, all welded with coved corners and anchor straps, full perimeter flange for installation under grout.
   B. Pitch to waste and provide stainless steel cup with removable perforated stainless steel basket.
   C. Overall trough size to be approximately 1'-6" wide ~x 2'-O" long.
   D. See plan for clarification. Coordinate with General Contractor and Plumbing Contractor to assure proper installation.
APPENDICES

Approved Manufacturers: IMC/Teddy Food Service Corporation Model FT-SG, Serv-o-LifeEastern, or pre-approved equal.

ITEM 25 NOT USED

ITEM 26 DISHMACHINE (1)

Provide gas powered machine with following features:

A. 44” unit
B. Convertible for low temperature or hot water final rinse
C. #16 gauge stainless steel tank and chamber. Provide oversized wash chamber option to accommodate sheet pans in upright position
D. 2 HP machine power wash motor with stainless steel pump and impeller
E. Self-draining pumps
F. 15 KW electric immersion heater, interwired at factory. Heater is to have solid state thermostat with positive low water protection.
G. Top mounted dial thermometers mounted in stainless steel enclosure
H. Motor controls wired to common electrical point in stainless steel control center mounted on top of machine. Motors to have built-in thermister overload protection with manual reset.
I. Dual side pawl conveyor driven by 1/6 HP motor.
J. Minimum capacity of 203 racks per hour
K. Ball detent clutch system to prevent damage to conveyor and drive motor if rack should be obstructed.
L. Stainless steel upper and lower wash arms with anti-clog nozzles. Both wash arms to be removable for cleaning without use of tools.
M. Final rinse automatically activated by racks in passing. Rinse agent dispenser injector and electrical interface points. Final rinse rate to be 5.0GPM.
N. Automatic fill with tank water level automatically maintained. Fill to be interrupted if door is opened. Drain handle to be located inside tank chamber and to be closed automatically upon lowering of inspection door.
O. Stainless steel front panel, frame, feet and legs.
P. Energy saver auto timer
Q. Removable self-flushing stainless steel strainer pans and large deep stainless steel basket removable from front of machine.
R. Door safety interlocks on all doors
S. Pump intake screen assembly
T. Built in integral wiring channel
U. Vent fan control
V. Stainless steel splash shields
W. Plastic strip curtains throughout
X. Conveyor dwell switch
Y. Table limit switch
Z. 2 vent cowls with locking dampers
AA. 4 peg, 2 combinations and 2 bun pan dish racks included
BB. Machine to have as standard a full two year warranty against manufacturer’s defects on parts, labor, and mileage. Extended 3 year warranty is to be provided making 5 years total coverage.
CC. Energy Star Certified
APPENDICES

Approved Manufacturers: Hobart Model CL44E, Champion 44-PRO VHR, Stero
Revised 5-10-04, Revised 10-29-07, Revised 7-19-10, Revised 7-25-17

ITEM 27 DISPENSER, MILK (MUST BE OPEN FRONT) - QUANTITY (3)
Provide mobile carton milk cabinet having the following features:
   A. Stainless steel interior and exterior
   B. Top mounted Removable refrigeration system
   C. Forced air refrigeration system
   D. Sliding lift up and down door(s)
   E. Reinforced cabinet interior bottom. Capacity to hold (12) standard milk cases.
   F. Floor drain with plug
   G. 6” casters
   H. 3 year parts and labor warranty, 5 year compressor parts warranty
   I. Magnetic snap-in EZ clean door gaskets
Approved Manufacture: Traulsen RMC49DR, or pre-approved equal

Revised 6-1-06, 7-25-17

ITEM 28 NOT USED
Revised 10-29-07

ITEM 29 QUANTITY (3)
   A. Horizontal ice cream freezer with glass angled lid
   B. Internal LED lighting
   C. Lid lock with keys
   D. 1 ½” dual swivel casters
   E. Power indicator light
   G. Slide-out, easy access condensing unit
   H. Maintain Temperature -18 to +10 degrees
   J. Three baskets with dividers
   K. External mounted thermometer
   L. 115V/60/1 with 9’ cord and plug attached
Approved Manufacturer: NorLake CTB-43-9 or pre-approved equal
Revised 6-1-06, Revised 10-29-07, Revised 07-15-10, 7-25-17

ITEMS 30, 31 NOT USED

ITEM 32 DISPOSAL, FOOD PREP & POTSINK AREA
Delete From Specs
Revised 7-19-10

ITEM 33 DUNNAGE RACK - QUANTITY AS SCHEDULED
Provide single deck dunnage platform unit with the following features to match Item 79 or 80.
   A. One piece polymer construction.
   B. Slotted deck.
   C. Arrange as shown on Plan drawings, using quantities and sizes as specified.
Approved Manufacturers: Cambro, Metro, Eagle, Amco
APPENDICES

ITEM 34  DISPOSAL, DISHWASH AREA   (1)
A. Voltage characteristics as scheduled.
B. 18” diameter stainless steel cone for welding to drain-board.
C. Auto-reversing control center including, magnetic starter(s) and start/stop buttons, in stainless steel NEMA 4 enclosure, or better, with disconnect switch.
D. Thermal overload protection either built into motor or in control center with manual reset.
E. Solenoid and vacuum breaker.
F. Control center to be mounted out of splash zone, under drain board on stainless steel mounting bracket as shown on details.
G. Short neck as necessary to provide clearance under disposal.
H. Coordinate installation of pre-rinse unit (item #65)
I. Low water pressure cutoff, with time delay for water after cut off occurs
J. Permanently lubricated ball bearings
K. Tubular stainless steel legs with bullet feet adjustable to 3 inches in either direction
L. Rubber isolating ring at cone mounting to reduce vibration and noise
M. Air cooled motor.

Approved Manufacturers: Bus Boy Model 3000, Hobart, Insinkerator
Revised 7-20-06, Revised 10-12-07

ITEM 35  DISPLAY CASE, REFRIGERATED, DROP-IN NOT USED
Revised 10-29-07

ITEM 36  NOT USED

ITEM 37  EXHAUST HOOD - QUANTITY (1)
Refer to the most current version of the Division 15 Mechanical & Plumbing Design Guidelines, sections 4.01, A, B & C.

ITEM 38  FAN, AIR CURTAIN - QUANTITY (1)
Provide air curtain fan having the following features:
   A. #304 stainless steel exterior with adjustable deflectors and adjustable air intake.
   B. Electrical characteristics as scheduled.
   C. Micro-switch for automatic door-actuated on-off control.
   D. 5-year warranty.

Revised 6-1-06.

ITEM 39  EQUIPMENT STAND - FOR ITEM 87 QUANTITY (1)
Approved Manufacturer: HOBART Model 205025, or pre-approved equal
Revised 10-29-07

ITEM 40  FIRE SUPPRESSION SYSTEM - QUANTITY (1)
Provide automatic wet chemical fire control system as required to protect exhaust hood, Item 37, and the cooking equipment located under this hood, and having the following features:
APPENDICES

A. All tanks, control heads, piping, relays, cable, fusible links, nozzles, elbows, etc., as required for complete system.
B. Brass nozzles and chrome plated or sleeved exposed piping.
C. Manual strike mechanism in accessible location.
D. Installation in accord with N.F.P.A. 17A code requirements and coordinate with exhaust hood construction and installation.
E. Four contacts for use by E.C., one contact for alarm, one for supply fan shut-Off, one for shunt trip actuation, and one spare.
F. Provide mechanical gas solenoid valve loose for installation by plumber.
Approved Manufacturers: Ansol Model R-1 02, Range Guard, Pyro-chem

ITEM 41 NOT USED

ITEM 42 FREEZER, REACH-IN, TWO-DOORS - NOT USED
Revised 10-29-07

ITEM 43 NOT USED

ITEM 44 GUIDE RAILINGS - QUANTITY AND LENGTH PER DRAWINGS
Provide guide railings with the following features:
   A. Double horizontal type rail
   B. 14 gauge stainless steel-all welded construction
   C. 2” tubing
   D. 6” radius on end uprights
   E. Die formed flanges with three 3/8” holes for fastening rail to floor
   F. All welds ground and polished to match commercial finish on railing
Approved Manufacturers: United Show Case Company, Inc., or pre-approved equal

ITEM 45 FRYERS NOT USED
Revised 6-01-06

ITEM 46 HOSE REEL - QUANTITY AS SCHEDULED
Provide open type retractable all-in-one hose reel system having the following features:
   A. B-1434 reel, open, stainless steel.
   B. Continuous pressure type vacuum breaker, B-963.
   C. Shut off control, ORK3.
   D. MV-0522 spray gun.
   E. B-1 31 base faucet.
   F. 50 feet of heavy duty hose.
   G. All chrome interconnecting piping.
   H. Mount on wall at location shown on drawings.
Approved Manufacturers: T&S, or pre-approved equal.

ITEMS 47, 48 NOT USED
ITEM 49          ICE MACHINE – (1)
Provide cube ice maker and bin having the following features:
ICE MAKER: ARI certified ice production based on 70°F incoming water and 90°F air
   A.  ARI Harvest rate minimum of 350 pounds
   B.  Self-contained, air cooled.
   C.  Electrical characteristics as scheduled.
   D.  Water filtration system
   E.  Manufacturer's standard finishes.
   F.  Arrange to make dice cube ice.
BIN:
   G.  Bin to have minimum 270 pound storage capacity
   H.  Manufacturer's standard finishes.
   I.  6" stainless steel legs.
   J.  ARI certified and rated in accordance with ARI Standard 820-88
   K.  NSF listed, UL approved
   L.  ENERGY STAR CERTIFIED
Mount icemaker on bin and install at location shown on drawings.
Approved Manufacturers: Hoshizaki  KML 350MAH, Ice-o-Matic ICE-0400, Manitowoc
Revised 1-02-07, Revised 11-05-08, Revised 7-19-10

ITEM 50- INGREDIENT BIN -DELETE FROM SPECS 5-15-15

ITEMS 51-54 NOT USED

ITEM 55    MIXER, 20 QUART NOT USED
Revised 10-29-07

ITEM 56-A   MIXER, 30 QUART       (1)
MIXER AND ACCESSORIES:
1.  # 12 attachment hub
2.  Removable s/s bowl guard
3.  Direct gear driven transmission. 3/4 HP motor by manufacturer.
4.  Three fixed speeds plus stir speed.
5.  Ability to shift gears while machine is operating. Automated soft transition into higher speed to
    avoid product splashing out of bowl
6.  15 minute timer
7.  Automatic time recall remembers last time set for each speed
8.  Ergonomic swing out bowl
9.  115/60/1 voltage, with 6-foot cord and plug.
10. 2 year parts, labor and mileage warranty against manufacturer’s defects.
11.  NSF and UL approved
12. Factory trained service technicians available for service.
13.  Powder coat paint
14.  Rubber foot pads
15. The motor shall have grease packed ball bearings, ventilation, and splash proof enclosure.
16.  Manufacturer provided accessories (no replacement brands):  s/s bowl, bowl truck-wire whip,
APPENDICES

flat beater, dough hook and ingredient chute.

Approved Manufacturer: Hobart HL-300, or pre-approved equal
Revised 10-12-07, Revised 11-20-08, Revised 5-15-15

ITEM 56-B MIXER, 30 QUART- DELETE FROM SPECS 5-15-15

ITEMS 57-63 NOT USED

ITEM 64 OVEN, CONVECTION, DOUBLE, GAS – (3 SETS)
OVEN, CONVECTION, DOUBLE, NATURAL GAS
Provide with following features:
2 sections, standard depth
_ Stainless steel front, top, and sides. Full metal rear cover
_ Solid stainless steel doors
_ Single porcelain door handle with simultaneous door operation
_ Triple-mounted pressure lock door design with turnbuckle assembly
_ Modular slide out front control panel for easy access & cleaning
_ Fully insulated at top, back, sides and bottom
_ Porcelain baking compartment liner (14 gauge)
_ Five chrome-plated racks, eleven rack positions
_ Two commercial bake oven lamps per compartment
_ Dual Flow Gas system
_ Electronic spark ignition
_ Pressure regulator
_ Manual gas service cut-off switch located on the front of the control panel
_ Air mixers with adjustable air shutters
_ Gas manifold for stacking
_ 48” gas hose with quick disconnect
_ Solid state thermostat with infinite temperature control range of 200°F to 500°F
_ Two speed fan motor
_ 1/3 horsepower blower motor with automatic thermal overload protection
_ Cook/Cool mode selector
_ Control area cooling fan
_ Solid state manual control with separate dials to control thermostat and timer
_ 60 minute timer
_ 6” adjustable stainless steel legs
_ Wired 120 volt with plug and cord attached
_ Two year oven parts and one year labor warranty
_ Five year oven door warranty
_ Replacement parts guaranteed available for 12 years from purchase date
_ NSF, UL or ETL approved
-- ENERGY STAR CERTIFIED.

Approved Manufacturers: Blodgett DFG-100, Hobart, Garland MCO-GS-10-ESS
Revised 07-15-10, Revised 12-01-11, Revised 5-15-15, 7-25-17
APPENDICES

ITEM 65    PRE-RINSE UNIT - QUANTITY (1) - INSTALL OVER DISHROOM DISPOSAL
Provide deck mounted pre-rinse unit having the following features:
   A. Flexible stainless steel hose.
   B. Self-closing spray nozzle.
   C. Wall support bracket.
   D. Mixing valve with integral check valves.
Approved Manufacturers: T&S Model B-113, or pre-approved equal.

ITEM 66    PRE-RINSE UNIT
Delete from specs.
Revised 7-19-10

ITEMS 67-68 NOT USED

ITEM 69    RACK, MOBILE POT AND PAN    (3)
Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
   A. Uprights shall be nominal 74" high, numbered at one inch intervals.
   B. Shelf connectors to be wedge lock type with corner collar.
   C. Each unit to be free standing.
   D. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
   E. Arrange using quantities and sizes as shown on plan drawings.
   F. 800 pound per shelf capacity, minimum.
Preferred Manufacturer: Metro Max Q Series Q556EG2, Eagle Lifestor, Amco Plastic Plus
Revised 10-12-07

ITEM 70    RACK, BUN PANS    (6)
Provide all-welded aluminum pan rack having the following features:
   A. End loading.
   B. Designed for 18” X 26” pans and trays.
   3” spacing between shelves
   C. 350 lb capacity
   D. 5” diameter swivel casters, with brakes.
   E. Lifetime guarantee against rust
Revised 10-12-07, Revised 7-19-10, 7-25-17

ITEM 71    NOT USED

ITEM 72    WALK-IN REFRIGERATOR/FREEZER
Provide pre-fabricated cold storage room assembly of size and shape shown on plan and detail drawings. Exact overall size to be field verified prior to fabrication.
APPENDICES

A. Insulation: Panels shall be insulated with 4" thick injected urethane, expanded with R1416, no CFC's used. Foam shall be 2.25 lb. density, 95% closed cell. Panels shall meet ASTME-84 (UL-723) and be listed by Underwriters laboratories and by Factory Mutual as a Class I building material.

B. Coved corners: Assembly shall be constructed so that all interior wall, floor and ceiling intersections shall comply with N.S.F. requirements.

C. Cam lock fasteners: All panel intersections and wall, floor and ceiling intersections shall be secured by cam lock fasteners.

D. Ceiling panels to be one piece, self-supporting and span full width of assembly.

E. Finishes: Aluminum exterior and interior finishes shall be as shown on drawings.

F. Doors: Door size and finish shall be as shown on drawings, and shall be furnished complete with sill wiper gasket, lift type hinges.

G. Hinges, latches and hardware shall be chrome plated. Minimum (3) hinges.

H. Exterior door to be equipped with automatic door closer.

I. Freezer door to be equipped with perimeter heat.

J. Exterior door(s) to be equipped with cylinder lock having inside safety release feature and also configured to allow use of padlock to secure door.

K. Aluminum kick plate to be provided on door.

L. Thermometers: Each compartment to be provided with exterior flush mounted dial thermometer mounted at eye level to each door.

M. Lights: Each compartment to be furnished complete with manufacturer's standard light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section. Extra lights as needed to provide 30 foot candles 30" above floor.

N. Floor: Quarry Tile

O. The floor and ceiling shall have maximum length panels to span full length of box if possible, otherwise stagger joints so there are no common "four corner" intersections and no joints occurring in doorways.

P. Refrigeration System: Shall be furnished by manufacturer as part of cold storage room assembly, provide each compartment with complete refrigeration system sized to maintain appropriate temperature.

Q. Condensing units to be semi-hermetic, or scroll type, air-cooled, remote. Units to have performance and wiring characteristics as scheduled on drawings. Units shall have pre-wired disconnects. Refrigeration systems to be designed for use with R404A or R507 refrigerant only.

R. Condensing units to be provided with painted galvanized steel all-weather housing, controls, and crankcase heaters, all suitable for outdoor conditions, and located as shown on drawings.

S. Unit coolers to be low-silhouette type, mounted at locations shown on drawings. Performance and wiring characteristics to be as scheduled on drawings. Freezer system to be provided with timed electric defrost.

T. Evaporator drain lines to be provided by this section and extended to floor receptors outside assembly.

U. Freezer drain lines to be wrapped with heater cable.

V. Refrigerant piping to be ACR copper tubing, hard temper, with wrought fittings and silver solder joints. Insulate suction lines with 1/2" pre-molded foamed plastic insulation.

W. Refrigeration systems to be provided with all required refrigerant piping, insulation, vibration eliminator, solenoid(s), dryer, suction line filter, expansion valve(s), thermostat(s), heat exchangers, and defrost timers, etc. as necessary for complete installation. Provide pump
APPENDICES

don control circuit consisting of thermostat and solenoid valve. All components including piping and insulation to be installed using accepted industry standards, manufacturer’s instructions and first class workmanship.

X. Miscellaneous:  Provide 1/8” diamond tread wainscot along exposed front exterior of assembly mounted from floor to 48” A.F.F.

Y. Provide trim strips, closure panels, etc., as necessary to trim assembly to adjacent building surfaces.

Z. Provide removable top closure panels with "C" channel rails. Lift-out panel sections to have turnover edges for strength and are not to exceed 4'-0" in length.

AA.  Provide plastic strip curtains at door locations, transparent vinyl overlapping strips, aluminum bar hanging rod and bracket, suitable for low temperature application, as manufactured by Curtron, Flexstrip Products, Inc., or equal.

BB.  Provide heated pressure relief port in freezer.

CC.  Provide sleeves properly located for utility entrance, drain lines, and refrigeration lines, and after lines are installed, fill sleeves with spray foam compound, suitable for use in refrigerated spaces.

DD.  Cold storage room shall be erected by factory trained and certified installers or shall be supervised by factory personnel. Refrigeration systems shall be furnished by cold storage room manufacturer and installed by factory authorized personnel.

EE. ENERGY STAR CERTIFIED

This specification does not constitute a complete description of cold storage assembly, also see plan and detail drawings.

Approved Manufacturers: Bally, Kolpak, , American Panel, Norlake, Masterbilt, Thermokool

Revised 6-1-06., Revised 07-15-10, Revised 12-1-11, 7-25-17

ITEMS 73-75 NOT USED

ITEM 76  REFRIGERATOR, REACH-IN - QUANTITY (1)

Provide two-section reach-in refrigerator with top mounted air-cooled condensing unit, exterior thermometer, cylinder door locks and top mounted condensate evaporator, having the following features:

A. Full length stainless steel doors, hinged as shown on drawings.

B. Stainless steel exterior and interior.

C. 6 stainless steel shelves in each compartment

D. Set of 5” swivel- type locking casters.

E. Wired for 120/1 operation, cord and plug set.

F. Energy Star Certified

Preferred Manufacturer: Traulsen RHT132WUT, Victory RS/RSA-2D-S1-HS/HG, Delfield SSR-2-S,

Note: 76, 77 and 103 must be provided by same manufacturer.

Revised 6-1-06, Revised 11-20-08, Revised 7-15-10, Revised 5-15-15, Revised 7-25-17

ITEM 77  REFRIGERATOR, PASS-THRU - QUANTITY AS SCHEDULED

Provide two-section pass-thru refrigerator with top mounted air-cooled condensing unit, exterior dial thermometer, cylinder door locks and top mounted condensate evaporator, having the following features.

A. Full length stainless steel doors, hinged as shown on drawings.
APPENDICES

B. Stainless steel exterior and interior.
C. Removable, universal type stainless steel pan slides, both sections.
D. Set of adjustable stainless steel legs
E. Stainless steel banking strip.
F. Customized stainless steel trim strip to seal cabinet to adjacent interior and exterior building surfaces.
G. Wired for 120/1 operation.
H. Install cabinet so that controls face kitchen area.
I. Energy Star Certified

Approved Manufacturers: Traulsen RHT232WPUT, Victory RS/RSA-2D-S1-PT-HS, Delfield SSR-PT-2

Note: items 76, 77 and 103 must be provided by the same manufacturer.
Revised 6-1-06, Revised 11-20-08, Revised 07-15-10, Revised 5-15-15, 7-25-17

ITEM 78  NOT USED

ITEM 79  SHELVING, REFRIGERATION - QUANTITY AS SCHEDULED
Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
- Uprights shall be nominal 74" high, numbered at one inch intervals.
  - A. Shelf connectors to be wedge lock type with corner collar.
  - B. Each unit to be free standing.
  - C. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
  - D. Arrange using quantities and sizes as shown on plan drawings.
  - E. 800 pound per shelf capacity, minimum.


ITEM 80  SHELVING, DRY STORAGE - QUANTITY AS SCHEDULED
Provide five-tier bright zinc plated wire shelving unit complete with tubular uprights and having the following features:
- Electro-zinc plated with chromate bath and clear protective coating.
- Uprights shall be nominal 86" high.
- Adjustible feet.
- D. Arrange using quantities and sizes as shown on Plan Drawings.

Approved Manufacturers: Metro, Eagle, Amco

ITEM 81  SILVERWARE CHUTE – NOT USED
Revised 10-29-07

ITEMS 82, 83 NOT USED

ITEM 84  SINK, POTWASHING - QUANTITY AS SCHEDULED
This item to be custom- fabricated in accord with General Requirements of specifications and with plan and detail drawings. Include disposal (#32) and pre-rinse (#66).

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
APPENDICES

ITEM 85  SINK, SILVER SOAK  -NOT USED
Revised 10-29-07

ITEM 86  SINK, VEGETABLE, TWO-COMPARTMENT - QUANTITY (1)
This item to be custom-fabricated in accord with General Requirements of specifications and with plan and detail drawings. Include disposal (#32) and pre-rinse unit (#66).
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 87  SLICER
Slicer, 12” automatic.
Features to be included:
1. ½ HP motor wired for 120/1 operation, with cord and plug set
2. Adjustable capacity: 12” wide or 7” diameter
3. Adjustable gauge plate up to 1” thickness
4. Stainless steel knife
5. Two speed automatic carriage drive
6. Top mounted removable sharpener with mineral stone
7. All metal finish
8. Lift lever for easy cleaning
9. MICROBAN antimicrobial protection
Approved Manufacturer: Hobart Model HS7, or pre-approved equal
Updated 7-25-17

ITEM 88  UTENSIL RACK
Provide utensil rack with the following features:
   A. 18 gauge stainless steel shelf.
   B. Stainless steel bar under shelf, mounted to brackets.
   C. Double stainless steel pot hooks approximately 8”o.c.
   D. See detail drawings.
Approved Manufacturers: Select Stainless, LowTemp Model SWS-9, Universal Stainless

ITEM 89  NOT USED

ITEM 90  COMBI OVENS  NOT USED
Revised 6-01-06

ITEM 91 STEAMER, CONVECTION - QUANTITY (2)
   A. Two compartment pressure-less floor model steamer
   B. Solid one-piece body for both compartments with heavy duty 14 gauge stainless steel construction for compartment door, interior and exterior walls.
   C. Totally independent cooking compartments with separate gas valve, ignition and water level controls. No shared components between compartments.
   D. Front access generator controls allowing complete service from front of unit
   E. Manual on/off switch which activates automatic fill/drainage via manual ball valve. Electric solenoid switch is not acceptable.
   F. Automatic water fill on start-up
APPENDICES

G. Exterior de-liming port
H. Generator de-liming light to alert operator when it is time to de-scale
I. Twin high efficiency power burner forced air generators rated at minimum of 72,000 BTU’s per compartment
J. Capacity for ten (10) 12” X 20” X 2 ½” pans.
K. Electronic spark ignition
L. Fan-less high velocity steam distribution system with brass steam jets.
M. Manual 60 minute electro-mechanical timers with load compensating feature and bypass switch for constant steaming.
N. Reversible door gaskets
O. Water filtration system
P. Three year warranty for parts, labor and mileage.
Q. Approved Manufacturers: Cleveland, Model 24-CGA10.2ES, or pre-approved equal.

NOTE: ITEMS # 91, #92 MUST BE PROVIDED BY THE SAME MANUFACTURER
Revised 6-1-06, Revised 11-20-08

ITEM 92   TRUNNION KETTLE, SINGLE, GAS - QUANTITY – (1)
Provide kettles with following features:
   A. One 6-gallon kettle on self-contained modular base with drain trough.
   B. Kettle steam jacket permanently filled with treated distilled water. Venting and/or refilling not required.
   C. Kettle to be 2/3 steam jacketed, type 304 stainless steel kettle and supports.
   D. Manual tilting, balanced design with mounting lugs on both sides, centered pouring lip.
   E. 50 PSI steam jacket ration, provided with safety and control valves.
   F. Nickel-guard coating that resists scale and corrosion.
   G. Stainless steel enclosure base with backsplash.
   H. Console mounted controls, pressure gauge, illuminated “Start/Reset” control switches.
   I. Solid State water level steam generator controls.
   J. Electronic spark ignition.
   K. Automatic water fill on start-up
   L. Automatic generator blow-down.
   M. Provide kettle lift-off cover and double pantry faucet.
   N. Provide with Secondary Low Water Cut-off per ASME-CSD-1 codes.
   O. 5-year boiler warranty

Approved Manufacturers: Cleveland Model KGT-6, or pre-approved equal.
ITEMS # 92, #91 MUST BE PROVIDED BY SAME MANUFACTURER
Revised 6-1-06, Revised 5-15-15

ITEM 93   TABLE, WORK (WITH SINK) - QUANTITY (1) - BAKING AREA
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Table is to include under-shelf and drawer. SINK MUST BE LOCATED AT END OF TABLE.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 94   TABLE, SOILED DISH - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel.
APPENDICES

Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 95  TABLE, CLEAN DISH - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 96  TABLE, PORTABLE - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 60” or 72” long, per drawings.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 97  TABLE, COOK’S (W/POT RACK AND SINK) - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer and under-shelf.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 98  TABLE, WORK - QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer and under-shelf.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 99  TABLE, BAKER - QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specs and with plan and detail drawings.

A. 14 gauge 304 stainless one piece, seamless stainless steel top, with 6” high integral riser on back and ends with coved corners. Overall size 30” X 84” long.
B. Stainless steel over-shelf, 16-gauge 304 stainless steel, with rear and ends flare up 2”. Height of shelf AFF is 74”.
C. Stainless steel legs fitted at top with fully enclosed stainless steel gussets welded to underbracing and at bottom, with adjustable stainless steel bullet feet. Front rail omitted on open base section to allow for ingredient bins.
D. Provide three (3) roller bearing drawers mounted on right side, 20” X 20” X 5”, 18-gauge stainless steel coved corned body, set in stainless steel channel frame and having stainless steel roller sides.
E. All joints ground and polished to match adjoining surfaces. Sound deaden underside of top.
F. NSF approved.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
Revised 6-01-06, Revised 10-29-07, Revised 07-15-10

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Note: The text above contains a variety of terms related to stainless steel tables, including dimensions, materials, and additional specifications. It is important to consult these guidelines for any project involving the fabrication of such tables, as they ensure compliance with industry standards and provide a clear understanding of the requirements for these types of furniture.
APPENDICES

ITEM 100  NOT USED

ITEM 101  VENT DUCT SET  - QUANTITY (1)
To be custom fabricated in accord with General Requirements of specifications and with plan and
detail drawings.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries

ITEM 102  WALL SHELF - QUANTITY AS SCHEDULED-MINIMUM (1) OVER WASHER
AND DRYER
This item to be custom fabricated in accord with General Requirements of specifications and with plan
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
Revised 11-28-08

ITEM 103  WARMING CABINET, PASS THRU - QUANTITY AS SCHEDULED
Provide one-section pass-through hot cabinet, having the following features. Note: items 76, 77, and
103 must be provided by the same manufacturer.
A. Half-height doors hinged as shown on drawings.
B. Stainless steel exterior and interior.
C. Removable, universal stainless steel pan slides, each half-door section.
D. Voltage characteristics as scheduled.
E. Set of adjustable stainless steel legs
F. Customized stainless steel trim strip to seal cabinet to adjacent interior and exterior building
surfaces.
G. Install cabinet so controls face kitchen.
H. Top housing to match refrigerator cabinet.
I. Energy Star Certified
Approved Manufacturers: Traulsen RHF132WP, Victory, Delfield SSH-PT-1
Revised 6-1-06, Revised 11-20-08, Revised 7-15-10, Revised 5-15-15

ITEM 104  WARMER CABINET/PROOFER, MOBILE - QUANTITY (1)
Provide mobile heater/proofering cabinet having the following features:
A. All stainless steel construction
B. 20 Amp plug with 8’ wire.
C. Universal Tray Slides to hold 14 bun pans or 28 steam table pans
D. Maintains temperatures from 85º F to 180º F
E. Circulating fan to maintain even temperature throughout cabinet, as well as speed initial
warm-up and recovery times
F. External thermometer
G. Dutch Doors
H. Bottom mounted water pan
I. 5” locking casters
J. Energy Star Certified
Approved Manufacturers: Winston HA4522-5, Traulsen RHF132W-FHS, Altoshaam, Wilder
Revised 11-20-08

ITEMS 105-117  NOT USED
APPENDICES

ITEM 118  STAINLESS STEEL UTILITY CHASE - (1)
Provide island utility chase to serve items under exhaust hood, having the following features:
A. Stainless steel construction.
B. UL label.
C. Designed to include electrical wire way.
D. Water tight electrical receptacles to match equipment. E. 1/2" gas manifold with tees and shut-off valves.
F. 1/2" hot water and cold water manifold with tees and shut-off valves.
G. Gas and water quick disconnects and appropriate cord and plug sets as required by equipment for installation under Division 15 and 16.
H. Manual gas shut-off valve for installation under Division 15.
I. Length as shown on drawings, with utilities coming from above.
J. Mount switches for pre-starter and hood lights in end riser, approximately 48" above the floor. Approved Manufacturers: Captive-Aire, Avtec Model ILUW , or pre-approved equal.

ITEM 122  PREP TABLE, MOBILE (2)
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 48” long.
Approved Manufacturers: Select Stainless, Universal Stainless, Low Temp Industries
Revised 10-29-07

ITEM 123  PAPER TOWEL DISPENSER - QUANTITY AS SCHEDULED Locate directly above the hand sinks in cafeteria areas:
A. Self-locking.
B. Holds 2-packages of single-fold towels. C. Stainless steel finish.
Approved manufacturers: A&J Washroom Accesories Model # U190, or pre-approved equal
Revised 6-1-06.

UPON TAKING OCCUPANCY OF CAFETERIA CHILD NUTRITION SERVICES IS TO RECEIVE TWO COPIES OF A COMPLETE LIST OF ALL KITCHEN EQUIPMENT, INDICATING THE MANUFACTURER, MODEL AND SERIAL NUMBERS FOR EVERY ITEM.

THIS CONCLUDES MIDDLE SCHOOL CAFETERIA EQUIPMENT SPECIFICATIONS
APPENDICES

11.4 HS Kitchen Equipment (1 of 23)

CHARLOTTE-MECKLENBURG SCHOOLS
CHILD NUTRITION SERVICES
HIGH SCHOOL
KITCHEN EQUIPMENT SPECIFICATIONS
AS OF JUNE 1, 2018

ALL FOODSERVICE EQUIPMENT TO BE NSF AND/OR UL APPROVED
WHENEVER APPLICABLE
IF DISCREPANCY EXISTS BETWEEN THE WRITTEN DESCRIPTION AND
MODEL NUMBERS, THE WRITTEN DESCRIPTION WILL TAKE PRECEDENCE.

ITEM 1 BEVERAGE MERCHANDISER, QUANTITY (6)
Provide merchandiser with the following features:
- Horizontal bottle cooler with single sliding door
- Forced air cabinet to chill and hold product between 32-38 degrees F
- Maximum dimensions: 36" length, 26 1/2 depth, 34" overall height
- Electrical 115/60/1 pre-wired with 8' cord and plug
- Provide optional stainless steel interior
- Provide optional stainless steel exterior
- Provide optional locking device
- Provide optional swivel casters
- NSF and UL approved
Approved Manufacturer: Beverage Air Model SF-34 or pre approved equal.
Revised 6-1-06, Revised 11-20-08, Revised 03-01-12, Revised 3-12-2018

ITEM 2 SPECIALTY DISPLAY CASE - QUANTITY AS SCHEDULED

A. Merchandiser-Air Curtain
B. Solid Rear Sliding Access Doors
C. Stainless steel interior, including Shelves
D. Two tiered shelves
E. Air temperature maintained at constant 35- 40 degrees F
F. On-demand PTC condensate evaporator provided for a totally self-contained system.
   A condensate pump is required on the LPRSS5 and LPRSS6.
G. Clearly visible thermometer to indicate air temperature
H. Provide optional casters
I. Provide optional lockable night cover
J. Light below shelves
K. Provide optional LED lighting
L. Unit pre-wired 115 / 60 / 1 for 15 amp dedicated outlet

Approved Manufacturer: Federal Refrigerated Self-Serve Low Profile Specialty Merchandiser
or pre-approved equal
Revised 10-29-07, Revised 11-21-08, Revised 5-15-15, Revised 7-25-17, 4/22/18
Length-48 inches if schedule provides one display case per line
ITEMS 3 NOT USED

ITEM 4 NOT USED
Revised 10-12-07

ITEM 5 BOOSTER HEATER (DISHMACHINE) (1)
Provide compact booster heater having the following features:
A. Castone, glass lined, or silicone bronze tank, 6 gallon capacity.
B. Low-water cut-off, temperature/pressure relief valve, pressure reducing valve, temperature/pressure gauge, and shock absorber.
C. Standard finish body and base.
D. Electrical characteristics as scheduled.
E. Under-counter mounting kit.
Approved Manufacturers: Hatco Corporation Model C36, or pre-approved equal.

ITEM 6 NOT USED

ITEM 7 BRAISING PAN-GAS (FUTURE)
Provide hood space all utilities for future installation
Revised 10-12-07
Approved Manufacturer: Cleveland SGL-T1 or pre-approved equal

ITEM 8 NOT USED
Revised 10-12-07

ITEM 9 CART, TRAY WITH SILVERWARE & NAPKIN DISPENSERS (6)
Provide tray and silver cart with the following features to match Items 12, 15, 16, 17, 18
A. Stainless steel construction.
B. One bottom shelf.
C. Tubular frame.
D. 4” non-marking ball bearing swivel type casters with brakes on all wheels.
E. Silverware container will be molded fiberglass and secured to tray dispenser frame by 1” 16 gauge stainless steel tubing.
F. Napkin holders to be mounted to each side. Dispenser to hold a folded napkin that is 3 1/2” wide X 5” high.
G. Standard height for secondary schools.
H. NSF listed
I. Color: Black
Approved Manufacturers: Colorpoint Model CPM-MTS, Delfield modified to above specifications, or pre-approved equal.
Revised 10-15-07, 3/13/18

ITEM 10 CART, UTILITY, THREE TIER (8)
A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 18” X 32” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers protect walls and furniture
E. 500 lb. capacity per shelf
F. 5” all swivel casters
APPENDICES

Approved manufacturer: Choice Equipment UC20-3321-3, Win-Holt UC-3-2133SS,
Lakeside 544
Revised 7-19-10, 3/13/18

ITEM 11 CASH REGISTERS & COMPUTER / NIC OWNER PROVIDED

ITEM 12 CASHIER STAND (6)

Provide modular counter of size and content as shown on plan and detail drawings, having the
following features to match items 9, 15, 16, 17, 18
36" high basic counter section with seamless molded fiberglass body, flame retardant per
ASTM E162 and flame spread of 25 or less.
A. 14 gauge stainless steel plain top with highlighted finish, turndown on all sides and
corners fully welded, ground, and polished.
B. Solid 12" wide, 14 gauge stainless steel "V" type tray slide for both sides, mounted at
34".
C. 1" diameter 18-gauge stainless steel foot rest shall be secured to the interior walls.
D. 6" diameter ball bearing swivel type casters to be non-marking and with brakes on all
wheels.
E. Provide a 2" diameter ferrule hole with rubber grommet in center top for electrical
cords.
F. 18 gauge stainless steel liner
G. Line-up locks on opposing corners.
H. One convenience outlet mounted inside the counter with 115v/15a outlet with 10a
breaker.
I. Stainless steel drawer, lockable. Not a cash drawer.
J. A 10" wide fold-down stainless steel shelf is to be mounted at 30” to back of cashiers
stand to hold keypad provided by others.
K. Provide a 2" diameter ferrule hole with rubber grommet in back of stand with conduit
to feed electrical cords from keypad to convenience outlet located inside of stand.
L. Color: Black

Approved Manufacturers: Colorpoint Model 36-CSE-F, Delfield KCS-36 modified to above
specifications, or pre-approved equal. Revised 3/13/2018

ITEMS 13 CART, UTILITY, TWO TIER (4)
A. Frame-16 gauge, 1” square tubing
B. 16 gauge reinforced, 21” X 33” stainless steel shelves
C. All stainless steel construction
D. Leg and handle bumpers
E. 500 lb. Capacity per shelf
F. Two shelves.
G. 5” all swivel casters

Approved manufacturer: Choice Equipment UC20-3321-2, Win-Holt UC-2-2133SS,
Lakeside 543, or pre-approved equal
Revised 10-15-07, Revised 7-19-10, 3-13-18

ITEM 14 NOT USED
ITEM 15  DISPLAY COUNTER, PLAIN TOP QUANTITY AS SCHEDULED
Provide modular serving counter of size and content as shown on plan drawings, having the
following features to match Items 9, 12,16, 17, 18
A.  36" high basic counter section with seamless molded fiberglass body,
   flame retardant per ASTM E162 and flame spread of 25 or less.
B.  Body lined with 18 gauge stainless steel, or
C.  Open base in rear of cabinet.
D.  30" wide 14 gauge stainless steel top with highlighted finish.
E.  Single tier tempered glass over shelf display stand to match food shield on hot counter.
F.  Solid 12" wide, 14- gauge stainless steel, "V" type tray slide, mounted 34" AFF.
G.  Fold down cutting board on server side, to facilitate restocking
H.  5" ball bearing swivel type casters to be non-marking, with brakes on all wheels.
    Casters to be mounted with interior and exterior bracing for maximum stress relief.
I.  Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.
J.  Install in banked line-up as shown on drawings. K.
Color: Black

Revised 10-12-07, Revised 8-25-15, Revised 5/21/18

ITEM 16  COUNTER, SOLID TOP, FOR CONDIMENTS AND ACCESSORIES (2)
Provide modular serving counter with the following features to match items 9, 12, 15, 17, 18
A.  36" high basic counter section with seamless molded fiberglass body, flame
    retardant per ASTM E162 and flame spread of 25 or less.
B.  Total length of unit to be 60"
C.  Body lined with 18-gauge stainless steel.
D.  Base to have under-storage with shelf and fiberglass door panels with locks
E.  30" wide, 14 gauge stainless steel top with highlighted finish
F.  Solid 12" wide, 14 gauge stainless steel, "V" type tray slide on both sides,
    mounted at 34" AFF.
G.  5" diameter ball bearing swivel type casters to be non-marking and with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.
H.  Color: Black
   Approved Manufacturer: Colorpoint Model 60 ST, Delfield modified to above specifications, or pre-approved equal.
Revised 10-12-07, 5/21/18

ITEM 17  COUNTER, HOT SERVING (6)
Provide modular serving counter of size and content as shown on plan drawings, having the
following Features to match items 9, 12, 15, 16, 18

A.  36" high basic counter section with seamless molded fiberglass body, flame retardant per
APPENDICES

ASTM E162 and flame spread of 25 or less. B. Body lined with 18-gauge stainless steel. 
C. Base to have under-storage with shelf and fiberglass door panels with locks.  
D. 30" wide 14-gauge stainless steel top with square turndown on all sides and corners fully welded, ground and polished.  

E. Recessed top accept 18" X 26" sheet pans.  
F. Five individually controlled dry/moist wells, with solid state digital controls wired to circuit breaker for current overload protection.  
G. Control panel to be hinged for service access.  
H. Hot food drains for each food well shall be plumbed to common manifold and extended to shut off valve under holding wells. Provide 4’ flexible hose to drain.  
I. Solid 12" wide, 14-gauge stainless steel, "V" type tray slide, mounted at 34”.  
J. 5” ball bearing swivel type casters to be non-marking, with brakes on all wheels. Casters to be mounted with interior and exterior bracing for maximum stress relief.  
K. 10” shelf on server side, fold down, and 14-gauge stainless steel.  
L. Single tier tempered glass over shelf with front tempered glass shield that is adjustable to allow attendant or self-service. Full sloped front protector to prevent customers from touching food. Ends top, and front to be 3/8” tempered glass. Versa-GardVG6S, Flexishieldorapprovedequal. 
M. Line-up locks to be barrel bolt and key slot design with cam locking action placed on opposing corners.  
N. Replacement Panels (5 ea.)  
O. All equipment to be built in accordance with Underwriters Laboratories, Inc. and bear the UL complete Unit listing label, no component parts listed equipment will be accepted, and shall also bear the UL listing seal for safety and certification label for sanitation.  
P. ELECTRICAL: 208 Volt / 1 phase /Max 2500 Watts  
Plug to be 120V-250V / 50 AMP / Twist Lock/ 4 wire/ Male.  
Q. Curved Infrared heat strip with LED lights built into the heat strip housing and wired to separate infinite control with on/off switch, and fused as required. Hatco Glo-Ray Model GR5AL– or preapproved equal. Black in color.  
R. Color: Black  
Approved Manufacturers: Colorpoint, Model EF5-CPA-F, Delfield KH-5-NU- modified to above specifications, or pre-approved equal  
Revised 6-1-06, Revised 11-25-08, 7-25-17, 5/20/18

ITEM 18 REFRIGERATED COLD FOOD TABLE-IN PLACE OF FROST  
TOP- QUANTITY AS SCHEDULED to match 9, 12, 15, 16, and 17  

A. 36” high basic counter with body to e seamless molded fiber glass with smooth exterior surfaces and rounded corners. Fiberglass to be flame retardant per specification ASTM E 162 having flame spread of 25 or less.  
B. Rear of body to have lockable storage made from 18 gauge stainless steel.  
C. Cold pans t be 18 gauge stainless steel fully welded construction with ¼” coved corners  

D. Cold pan shall be pitched to a 1” drain, which is extended to a valve below the base.
APPENDICES

E. All cold pans shall be furnished with urethane insulation on bottom and all four sides of pan.
F. Pan shall be fully separated from the counter top by a full perimeter breaker strip.
G. Cold pans are to allow for a full steam table pan 6” deep.
H. Temperature is maintained by a static air system utilizing 1/2” copper coils attached to the liner bottom and sides to a level 1” above the food pans.
I. Food pans to be supported by full length removable brackets located 3” below the top. Single tier tempered glass over shelf with front tempered glass shield. Straight tempered glass food protector, Versa-Gard, Flexishield, or approved equal.

K. 5” diameter, ball bearing, swivel type casters to be non-marking and with brakes on all wheels.
L. Color: Black
   Approved manufacturers: Colorpoint 50-CFXM-F, Delfield KCSC-B modified to above specifications, or pre-approved equal.
   Revised 5/20/18

ITEM 19, 20 NOT USED

ITEM 21 FOOD CUTTER DELETE FROM SPECS 5-15-15

ITEM 22 NOT USED

ITEM 23 TRAY DOLLY – QUANTITY (6)
   A. 16 gauge, 304 stainless steel construction
   B. 800 pound rolling capacity
   C. Holds 2 stacks of 12” X 16” cafeteria trays
   D. 1 ¼” lip to securely hold trays
   E. 5” all swivel casters
   F. Lifetime guarantee against rust or corrosion
   Approved Manufacturers: CHOICE Model UC200-1625, Win-Holt D1625/SS, Lakeside, or pre-approved equal. Revised 10-29-07. 10-05-15

ITEM 24 TROUGH, FLOOR- STAINLESS STEEL QUANTITY AS SCHEDULED
Provide floor trough with removable grate having the following features:
Grate:
   A. All Stainless steel welded construction.
   B. 3/16" x 1" flat bars set on edge, with 13/16" clearance between bars.
   C. Two 1/2" diameter rods wedged through bars full length, and weld to each bar.
   D. Size to suit trough with removable sections not to exceed 20" long.

Trough:
   E. 14 gauge 304 18-8 stainless steel, all welded with coved corners and anchor straps, full perimeter flange for installation under grout.
   F. Pitch to waste and provide stainless steel cup with removable perforated stainless steel basket.
   G. Overall trough size to be approximately 1'-6" wide ~x 2'-0" long.
APPENDICIES

H. See plan for clarification. Coordinate with General Contractor and Plumbing Contractor to assure proper installation.

Approved Manufacturers: IMC/Teddy Food Service Corporation Model FT-SG, Serv-o-Lift, Eastern, or pre-approved equal.

ITEM 25 NOT USED

ITEM 26 DISHMACHINE

Provide gas or electric powered machine with following features:

A. 44” machine
B. Convertible for low temperature or hot water final rinse
C. #16 gauge stainless steel tank and chamber.
D. Oversized wash chamber option to accommodate sheet pans in upright position

D. 2 HP machine power wash motor with stainless steel pump and impeller

E. Self draining pumps
F. 15 KW electric immersion heater, inter-wired at factory. Heater is to have solid state thermostat with positive low water protection.
G. Top mounted dial thermometers mounted in stainless steel enclosure

Motor controls wired to common electrical point in stainless steel control center mounted on top of machine. Motors to have built-in thermister overload protection with manual reset.

H. Dual side pawl conveyer driven by 1/6 HP moto.
I. Minimum capacity of 203 racks per hour
J. Ball detent clutch system to prevent damage to conveyer and drive motor if rack should be obstructed.
K. Stainless steel upper and lower wash arms with anti-clog nozzles. Both wash arms to be removable for cleaning without use of tools.
L. Final rinse automatically activated by racks in passing. Rinse agent dispenser injector and electrical interface points. Final rinse rate to be 5.0GPM.
M. Automatic fill with tank water level automatically maintained. Fill to be interrupted if door is opened. Drain handle to be located inside tank chamber and to be closed automatically upon lowering of inspection door.
N. Stainless steel front panel, frame, feet and legs.
O. Energy saver auto timer
P. Removable self-flushing stainless steel strainer pans and large deep stainless steel basket removable from front of machine.
Q. Door safety interlocks on all doors
R. Pump intake screen assembly
S. Built in integral wiring channel
T. Vent fan control
U. Stainless steel splash shields
V. Plastic strip curtains throughout
W. Conveyor dwell switch
X. Table limit switch
Y. 2 vent cowls with locking dampers
Z. 4 peg, 2 combinations and 2 bun pan dish racks included
APPENDICES

AA. Machine to have as standard a full two year warranty against manufacturer’s defects on parts, labor, and mileage. Extended 3 year warranty available making 5 years total coverage.

Approved Manufacturers: Hobart Model CL44eN, Champion 44-PRO, Stero

Revised 10-12-07, Revised 12-1-11, 3/13/18

ITEM 27 DISPENSER, MILK (MUST BE OPEN FRONT - QUANTITY AS SCHEDULED

Provide mobile carton milk cabinet having the following features:

A. Stainless steel interior and exterior
B. Top mounted Removable refrigeration system
C. Forced air refrigeration system
D. Sliding lift up and down door(s)

E. Reinforced cabinet interior bottom. Capacity to hold (12) standard milk cases.
F. Floor drain with plug
G. 6” casters
H. Heavy Duty Dunnage Racks

I. 3 year parts and labor warranty, 5 year compressor parts warranty
J. Magnetic snap-in EZ clean door gaskets

Approved Manufacture: Traulsen RMC49D6, or pre-approved equal

Revised 6-1-06, 7-25-17

ITEM 28 DISPENSER, ICE (2)

Provide ice dispenser with following features:

A. Stainless steel exterior cabinet with merchandiser and “Ice” sign
B. Push lever ice-dispense.
C. 90 pound ice storage capacity.
D. Electrical 120V/60HZ/2.5 FLA.
E. Two ¾” PVC drain fittings, one from drain pan and one from bin.
F. Dispenses any size cube up to one-inch square.
G. Motor, drain and electrical connections are front-serviceable.
H. Provide drain hose to floor trough
I. Provide and install 4” stainless steel legs.

Approved manufacturers: SerVend Model M90, or pre-approved equal.

ITEM 29 DISPENSER, ICE CREAM (1)

Horizontal ice cream freezer with glass angled lid

B. Internal LED lighting
C. Lid lock with keys
D. 1 ½” dual swivel casters
E. Power indicator light
G. Slide-out, easy access condensing unit
H. Maintain Temperature -18 to +10 degrees

J. Three baskets with dividers
APPENDICES

K. External mounted thermometer
   L. 115V/60/1 with 9’ cord and plug attached
Approved Manufacturer: NorLake CTB-43-9, Masterbilt or pre-approved equal
Revised 6-1-06, Revised 10-29-07, Revised 07-15-10, 7-25-17

ITEMS 30, 31 NOT USED

ITEM 32 DISPOSAL, FOOD PREP & POT SINK AREA
Delete from Specifications
Revised 7-20-06, Revised 10-12-07, Revised

ITEM 33 DUNNAGE RACK QUANTITY AS SCHEDULED
Provide single deck dunnage platform unit with the following features to match Item 79 or 80.
A. One piece polymer construction.
B. Slotted deck.
C. Arrange as shown on Plan drawings, using quantities and sizes as specified. Approved Manufacturers: Metro Model HP2236PD, Cambro, Eagle

ITEM 34 DISPOSAL, DISHWASH AREA (1)
A. Voltage characteristics as scheduled.
B. 18” diameter stainless steel cone for welding to drain-board.
C. Auto-reversing control center including, magnetic starter(s) and start/stop buttons, in stainless steel NEMA 4 enclosure, or better, with disconnect switch.
D. Thermal overload protection either built into motor or in control center with manual reset.
E. Solenoid and vacuum breaker.
F. Control center to be mounted out of splash zone, under drainboard on stainless steel mounting bracket as shown on details.
G. Short neck as necessary to provide clearance under disposal.
H. Coordinate installation of pre-rinse unit (item #65)
I. Low water pressure cutoff, with time delay for water after cut off occurs
J. Permanently lubricated ball bearings
K. Tubular stainless steel legs with bullet feet adjustable to 3 inches in either direction
L. Rubber isolating ring at cone mounting to reduce vibration and noise
M. Air cooled motor.
Approved Manufacturers: Bus Boy Model 3000, Hobart, Insinkerator
Revised 7-20-06, Revised 10-12-07

ITEM 35 DISPLAY CASE, REFRIGERATED, COUNTER TOP – (2)
Provide unit with following features:
1. Condensing component mounted on rear
2. Optional LED lighting
3. Rear has (2) adjustable and removable doors
4. Removable back display deck
5. Locks for all doors
APPENDICES

6. External dimensions of 48”W x 29 “D x 28”H
7. Adjustable shelves
8. Cord and plug-NEMA 5-15P
9. If GFCI circuit is required, GFCI breaker must be used instead of GFCI receptacle
   Approved Manufacturer: Federal CRB4828, or pre-approved equal. Revised 5/23/18

ITEM 36 NOT USED

ITEM 37 EXHAUST HOOD (1)
Refer to most current version of division 15 Mechanical & Plumbing Design Guidelines,
Sections 4.01, A, B, and C.

ITEM 38 FAN, AIR CURTAIN (1)
Provide air curtain fan having the following features:
   A. #304 stainless steel exterior with adjustable deflectors and adjustable air
      intake. B. Electrical characteristics as scheduled.
   C. Micro-switch for automatic door-actuated on-off
      control. D. 5-year warranty.

Approved Manufacturers: Berner ASR1036A-SS, Mars Door Company
Model48CH, Universal Jet Industries,
Revised 6-1-06.

ITEM 39 EQUIPMENT STAND (for item 21)

DELETE ITEM 40 FIRE

SUPPRESSION SYSTEM (1)
Provide automatic wet chemical fire control system as required to protect exhaust hood,
Item 37, and the cooking equipment located under this hood, and having the following features:
   A. All tanks, control heads, piping, relays, cable, fusible links, nozzles, elbows, etc.,
      as required for complete system.
   B. Brass nozzles and chrome plated or sleeved exposed
      piping. C. Manual strike mechanism in accessible location.
   D. Installation in accord with N.F.P.A. 17A code requirements and coordinate
      with exhaust hood construction and installation.
   E. Four contacts for use by E.C., one contact for alarm, one for supply fan shut-Off,
      one for shunt trip actuation, and one spare.
   F. Provide mechanical gas solenoid valve loose for installation by plumber.

Approved Manufacturers: Ansul Model R-1 02, Range Guard, Pyro-chem

ITEM 41 NOT USED

ITEM 42 FREEZER, REACH-IN, TWO DOORS (Future)
Provide electrical service for future installation

ITEM 43 NOT USED
APPENDICES

ITEM 44  GUIDE RAILINGS  QUANTITY AND LENGTH PER DRAWINGS

Provide guide railings with the following features:
1. Double horizontal type rail
2. 14 gauge stainless steel-all welded construction
3. 2” tubing
4. 6” radius on end uprights
5. Die formed flanges with three 3/8” holes for fastening rail to floor
6. All welds ground and polished to match commercial finish on railing

Approved Manufacturers: United Show Case Company, Inc., or pre-approved equal

ITEM 45  NO LONGER USED

ITEM 46  HOSE REEL  QUANTITY AS SCHEDULED
Provide open type retractable all-in-one hose reel system having the following features:
A. B-1434 reel, open, stainless steel.
B. Continuous pressure type vacuum breaker, B-963.
C. Shut off control, ORK3.
D. MV-0522 spray gun.
E. B-1 31 base faucet.
F. 50 feet of heavy duty hose.
G. All chrome interconnecting piping.
H. Mount on wall at location shown on drawings.

Approved Manufacturers: T&S, or pre-approved equal.

ITEM 47, 48  NOT USED

ITEM 49  ICE MACHINE  (1)
Provide elevated bin and gravity loading cart system with the following features:

ICE MACHINE
A. Up to 630 lbs. of ice produced per 24 hours
B. Produces crescent shaped ice cubes
C. Stainless steel exterior
D. Ambient temperature range 45-100°
E. Water temperature range 45-90°
F. Self-contained, air cooled
G. Water filtration system
H. Three years warranty parts and labor on entire machine
I. Five years warranty parts and labor on evaporator

BIN:
J. Bin to have minimum 500 lb. storage capacity
K. 6” stainless legs
APPENDICES

L. NSF listed, UL approved
   Approved manufacturers: Hoshizaki KM-650MAJ, Ice-O-Matic to above specs, pre- approved equal, or
   pre-approved equal

ITEM 50 INGREDIENT BIN –DELETE FROM SPECS 5-15-15

ITEMS 51-54 NOT USED

ITEM 55 MIXER, 20 QUART DELETE FROM SPECS 5-15-15

ITEM 56 MIXER, 30 QUART (1) MIXER AND
ACCESSORIES:
   1. # 12 attachment hub
   2. Removable s/s bowl guard
   3. Direct gear driven transmission. ¾ HP motor by manufacturer.
   4. 115/60/1 voltage, with 6-foot cord and plug.
   5. 2 year parts, labor and mileage warranty against manufacturer’s defects.
   6. NSF and UL approved
   7. Factory trained service technicians available for service.
   8. Powder coat paint
   9. The motor shall have grease packed ball bearings, ventilation, splash proof enclosure and certified by the
      Baking Industry Sanitation Standard Committee.
   10. Manufacturer provided accessories (no replacement brands): s/s bowl, bowl truck, wire whip, flat beater,
       dough hook and ingredient chute.
   Approved Manufacturer: Hobart D-300, or pre-approved equal
   Revised 10-12-07, Revised 5-15-15, Revised 5-21-18

ITEMS 57-63 NOT USED

ITEM 64 OVEN, CONVECTION, DOUBLE, GAS (3)
Provide gas-fired convection oven having the following features:
   2 sections, standard depth
   _ Stainless steel front, top, and sides. Full metal rear cover
   _ Solid stainless steel doors
   _ Single porcelain door handle with simultaneous door operation
   _ Triple-mounted pressure lock door design with turnbuckle assembly
   _ Modular slide out front control panel for easy access & cleaning
   _ Fully insulated at top, back, sides and bottom
   _ Porcelain baking compartment liner (14 gauge)
   _ Five chrome-plated racks, eleven rack positions
   _ Two commercial bake oven lamps per compartment
   _ Dual Flow Gas system
   _ Electronic spark ignition
   _ Pressure regulator
   _ Manual gas service cut-off switch located on the front of the control panel
   _ Air mixers with adjustable air shutters
   _ Gas manifold for stacking
   _ 48” gas hose with quick disconnect
APPENDICES

- Solid state thermostat with infinite temperature control range of 200°F to 500°F
- Two speed fan motor
- 1/3 horsepower blower motor with automatic thermal overload protection
- Cook/Cool mode selector
- Control area cooling fan
- Solid state manual control with separate dials to control thermostat and timer
- 60 minute timer
- 6” adjustable stainless steel legs
- Wired 120 volt with plug and cord attached
- Two year oven parts and one year labor warranty
- Five year oven door warranty
- Replacement parts guaranteed available for 12 years from purchase date
- NSF, UL or ETL approved
-- ENERGY STAR CERTIFIED.

ITEM 65 PRE-RINSE UNIT (1) INSTALL OVER DISHROOM DISPOSAL
Provide deck mounted pre-rinse unit having the following features:
A. Flexible stainless steel hose. B. Self-closing spray nozzle.
C. Wall support bracket.
A. Mixing valve with integral check valves.
Approved Manufacturers: T&S Model B-1 13, Chicago Faucet, or pre-approved equal.

ITEM 66 PRE-RINSE UNIT– GENERAL KITCHEN USE
Delete from Specifications.
Revised

ITEMS 67-68 NOT USED

ITEM 69 RACK, MOBILE POT AND PAN QUANTITY AS SCHEDULED (3 MINIMUM)
Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
A. Uprights shall be nominal 74” high, numbered at one inch intervals. B. Shelf connectors to be wedge lock type with corner collar.
C. Each unit to be free standing.
D. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
E. Arrange using quantities and sizes as shown on plan drawings. F. 800 pound per shelf capacity, minimum.
Preferred Manufacturer: Metro, Metro-Max Q Series Q556EG2, Eagle Lifestor, Amco Plastic Plus
Revised 10-12-07

ITEM 70 RACK, BUN PANS (6)
APPENDICES

Provide all-welded aluminum pan rack having the following features:
A. End loading.
B. Designed for 18” X 26” pans and trays. 3” spacing between shelves
C. 350 lb capacity
D. 5” diameter swivel casters, with brakes. E. Lifetime guarantee against rust
Revised 10-12-07, Revised 7-19-10, 7-25-17

ITEM 71      NOT USED

ITEM 72     WALK-IN REFRIGERATOR/FREEZER      (1)
Provide pre-fabricated cold storage room assembly of size and shape shown on plan and detail drawings. Exact overall size to be field verified prior to fabrication.
A. Insulation: Panels shall be insulated with 4” thick injected urethane, expanded with R1416, no CFC's used. Foam shall be 2.25 lb. density, 95% closed cell. Panels shall meet ASTME-84 (UL-723) and be listed by Underwriters laboratories and by Factory Mutual as a Class I building material.
B. Coved corners: Assembly shall be constructed so that all interior wall, floor and ceiling intersections shall comply with N.S.F. requirements.
C. Cam lock fasteners: All panel intersections and wall, floor and ceiling intersections shall be secured by cam lock fasteners.
D. Ceiling panels to be one piece, self-supporting and span full width of assembly.
E. Finishes: Aluminum exterior and interior finishes shall be as shown on drawings.
F. Doors: Door size and finish shall be as shown on drawings, and shall be furnished complete with sill wiper gasket, lift type hinges.
G. Hinges, latches and hardware shall be chrome plated. Minimum (3) hinges. H. Exterior door to be equipped with automatic door closer.
I. Freezer door to be equipped with perimeter heat.
J. Exterior door(s) to be equipped with cylinder lock having inside safety release feature and also configured to allow use of padlock to secure door.
K. Aluminum kick plate to be provided on door.
L. Thermometers: Each compartment to be provided with exterior flush mounted dial thermometer mounted at eye level to each door.
M. Lights: Each compartment to be furnished complete with manufacturer's standard light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section. Extra lights as needed to provide 30 foot candles 30” above floor.
N. Floor: Quarry Tile
O. The floor and ceiling shall have maximum length panels to span full length of box if possible, otherwise stagger joints so there are no common “four corner” intersections and no joints occurring in doorways.
P. Refrigeration System: Shall be furnished by manufacturer as part of cold storage room assembly, provide each compartment with complete refrigeration system sized to maintain appropriate temperature.
Q. Condensing units to be semi-hermetic, or scroll type, air-cooled, remote. Units to have performance and wiring characteristics as scheduled on drawings. Units shall have pre- wired disconnects. Refrigeration systems to be designed for use with R404A or
APPENDICES

R507 refrigerant only.
R. Condensing units to be provided with painted galvanized steel all-weather housing, controls, and crankcase heaters, all suitable for outdoor conditions, and located as shown on drawings.
S. Unit coolers to be low-silhouette type, mounted at locations shown on drawings. Performance and wiring characteristics to be as scheduled on drawings. Freezer system to be provided with timed electric defrost.
T. Evaporator drain lines to be provided by this section and extended to floor receptors outside assembly.
U. Freezer drain lines to be wrapped with heater cable.
V. Refrigerant piping to be ACR copper tubing, hard temper, with wrought fittings and silver solder joints. Insulate suction lines with 3/4" pre-molded foamed plastic insulation.
W. Ensure bracing of refrigeration line every 7 feet.
X. If bracing is overhead, 12" saddles are required at support
Y. All insulated portions of refrigerant line to be equal or greater than R-7.1
Z. Refrigeration systems to be provided with all required refrigerant piping, insulation, vibration eliminator, solenoid(s), dryer, suction line filter, expansion valve(s), thermostat(s), heat exchangers, and defrost timers, etc. as necessary for complete installation. Provide pump down control circuit consisting of thermostat and solenoid valve. All components including piping and insulation to be installed using accepted industry standards, manufacturer’s instructions and first class workmanship.
AA. Miscellaneous: Provide 1/8" diamond tread wainscot along exposed front exterior of assembly mounted from floor to 48" A.F.F.
BB. Provide trim strips, closure panels, etc., as necessary to trim assembly to adjacent building surfaces.
CC. Provide removable top closure panels with “C” channel rails. Lift-out panel sections to have turndown edges for strength and are not to exceed 4’-0” in length.
DD. Provide plastic strip curtains at door locations, transparent vinyl overlapping strips, aluminum Bar hanging rod and bracket, suitable for low temperature applications, as manufactured by Curtron Flexstrip Products, Inc. or equal.
EE. Provide heated pressure relief port in freezer.
FF. Provide sleeves properly located for utility entrance, drain lines, and refrigeration lines, and after lines are installed, fill sleeves with spray foam compound, suitable for use in refrigerated spaces.
GG. Cold storage room shall be erected by factory trained and certified installers or shall be supervised by factory personnel. Refrigeration systems shall be furnished by cold storage room manufacturer and installed by factory authorized personnel.

ENERGY STAR CERTIFIED

Lights:
Each compartment to be furnished complete with Kason model 1806 LED light fixture, having protective cover, mounted and pre-wired to switch with pilot light in door section.
  a. Unbreakable lexan jar.
  b. Rated 50,000 hr. life.

c. Exceeds Federal Energy Act requirement at 85 lumens/watt.
d. Lamps to be cULus listed, NSF listed and RoHS compliant.
e. Reach full light immediately at lowest temperatures.
f. 5-yr. limited warranty on fixture.
g. 3-yr. limited warranty on lamps.
h. Extra Kason model 1810 4-ft. LED lights as needed to provide 30 foot candles 30" above floor.
i. Unbreakable IP-65 polycarbonate enclosure.
APPENDICES

k. Rated 50,000 hr. life.
l. 5-yr. limited warranty on fixture.
m. 3-yr. limited warranty on lamps.
n. Reach full light immediately at lowest temperatures.
o. Lamps to be cULus listed, NSF listed and RoHS compliant.
Revised 12-20-11, Revised 5-15-15

This specification does not constitute a complete description of cold storage assembly, also see plan and detail drawings.
Approved Manufacturers: Bally, Kolpak, American Panel, Norlake, Masterbilt, Thermokool
Revised 6-1-06, Revised 07-15-10, Revised 12-1-11, 7-25-17, 5-3-18

ITEMS 73-75 NOT USED

ITEM 76 REFRIGERATOR, REACH-IN (1)
Provide one-section reach-in refrigerator with top mounted air-cooled condensing unit, exterior thermometer, cylinder door locks and top mounted condensate evaporator, having the following features:
Items 76, 77 and 103 must be provided by same manufacturer.
A. Full length stainless steel doors, hinged as shown on drawings.
B. Stainless steel exterior and interior.
C. *S/Universalpanslidoaccomodate1418x26sheetpans*
D. Set of 5” swivel-type locking casters.
E. Wired for 120/1 operation, cord and plug set.
Approved manufacturer: Traulsen RHT132WUT, Victory RS/RSA-1D-S1-EW, pre-approved equal.
Revised 7-20-06, Revised 3-01-12, Revised 5-15-15, Revised 5/21/18

ITEM 77 REFRIGERATOR, PASS-THRU QUANTITY AS SCHEDULED

Provide two-section pass-thru refrigerator with top mounted air-cooled condensing unit, exterior dial thermometer, cylinder door locks and top mounted condensate evaporator, having the following features.
Items 76, 77 and 103 must be provided by the same manufacturer.
A. Full length stainless steel doors, hinged as shown on drawings.
B. Stainless steel exterior and interior.
C. Removable, universal type pan slides, both sections.
D. Set of adjustable stainless steel leg.
E. Stainless steel banking strip.
F. Customized stainless steel trim strip to seal cabinet to adjacent interior and exterior building surfaces.
G. Wired for 120/1 operation.

A. External thermometer
B. Install cabinet so that controls face kitchen area.

Approved Manufacturers: Traulsen RHT232WPUT, Victory, or pre-approved equal
Revised: 7-20-06, Revised 10-12-07, 3-01-12, Revised 5-15-15

ITEM 78 NOT USED
APPENDICES

ITEM 79  SHELVING, REFRIGERATION  QUANTITY AS SCHEDULED Provide four-tier polymer shelving unit complete with tubular uprights and having the following features:
A. Uprights shall be nominal 74” high, numbered at one inch intervals.
B. Shelf connectors to be wedge lock type with corner collar.
C. Each unit to be free standing.
D. Shelf frames shall be made of steel with electroplated substrate and epoxy finish. Shelf mats to be injection molded polypropylene.
E. Arrange using quantities and sizes as shown on plan drawings. F. 800 pound per shelf capacity, minimum.
Approved Manufacturers: Metro-Max Q Series, Eagle Lifstore, Amco Plastic Plus

ITEM 80  SHELVING, DRY STORAGE  QUANTITY AS SCHEDULED Provide five-tier bright zinc plated wire shelving unit complete with tubular uprights and having the following features:
A. Electro-zinc plated with chromate bath and clear protective coating. B. Uprights shall be nominal 86” high.
C. Adjustable feet.
D. Each unit to be free standing.
E. Arrange using quantities and sizes as shown on Plan Drawings. Approved Manufacturers: Metro, Eagle, Amco

ITEM 82  HAND SINK, DROP-IN (1)
Provide stainless steel lavatory having the following features:
A. 14 gauge stainless steel, 10” x 14” x 10”
D. Chrome plated goose-neck faucet.
C. Strainer type waste outlet.
D. Built into Beverage Counter, Item 128.
Sink to be as manufactured by Select Stainless, Universal, or Low Temp.

ITEM 83  NOT USED

ITEM 84  SINK, POTWASHING (1)
This item to be custom-fabricated in accord with General Requirements of specifications and with plan and detail drawings. Include disposal (#32) and pre-rinse (#66).
Approved Manufacturers: Select Stainless, Universal, and Low Temp.

ITEM 85  NOT USED

ITEM 86  SINK, VEGETABLE, and TWO-COMPARTMENT (1)
This item to be custom-fabricated in accord with General Requirements of specifications and with plan and detail drawings. Include disposal (#32) and pre-rinse (#66).
Approved Manufacturers: Select Stainless, Universal, and Low Temp.

ITEM 87  SLICER Slicer, 12”
automatic. Features to be included:
1. ½ HP motor wired for 120/1 operation, with cord and plug set
2. Adjustable capacity: 12” wide or 7” diameter
3. Adjustable gauge plate up to 1” thickness
APPENDICES

4. Stainless steel knife
5. Two speed automatic carriage drive
6. Top mounted removable sharpener with mineral stone
7. All metal finish
8. Lift lever for easy cleaning
9. MICROBAN antimicrobial protection
   Approved Manufacturer: Hobart Model HS7, Globe Model 3850, or pre-approved equal

ITEM 88 UTENSIL RACK, TABLE MOUNTED QUANTITY AS SCHEDULED
Provide utensil rack with the following features:
A. Double rail constructed of 3/16” x 2” flat bar 304 stainless steel. B. 1 5/8” stainless steel tubing legs, mounted and secured to table. Provide utensil rack with the following features:
   A. 18 gauge stainless steel shelf.
   B. Stainless steel bar under shelf, mounted to brackets. C. Double stainless steel pot hooks approximately 8” o.c. D. See detail drawings.

Approved Manufacturers: LowTemp Model SWS-9, or pre-approved equal.

ITEM 89 NOT USED

ITEM 90 STEAMER, COMBI/OVEN, DOUBLE STACK, GAS (1)
Provide product with following features:
1. Gas powered unit with 210,000 BTU power rating
2. Two full sized compartments
3. Glass doors
4. Five stainless steel wire shelves per compartment
5. Easy to operate mechanical controls
6. Automatic fast cool down control
7. Two speed fan (high/low) control switch
8. Humidity release control switch
9. Generator drain control
10. Core temperature probe with digital read-out which automatically turns off unit when desired temperature is reached
11. Condensate drip tray which automatically empties into floor drain
12. NSF approved 6” stainless steel adjustable legs
13. Spray head and flexible hose for cleaning
14. Water filtration system
15. Three year warranty for parts, labor and mileage

Approved Manufacturers: Cleveland Convotherm, AltoShaam, Rational

ITEM 91 STEAMER, CONVECTION (2)
NOTE: ITEMS #91, #92 MUST BE PROVIDED BY THE SAME MANUFACTURER
1. Two compartment pressure-less floor model steamer.
2. Solid one- piece body for both compartments with heavy duty 14 gauge stainless steel construction for compartment door, interior and exterior walls.
3. Totally independent cooking compartments with separate gas valve, ignition and water level controls. No shared components between compartments.
APPENDICES

4. Front access generator controls allowing complete service from front of unit
6. Exterior de-liming port
7. Generator de-liming light to alert operator when its time to de-scale
8. Twin high efficiency power burner forced air generators rated at minimum of 72,000 BTU’s per compartment
9. Capacity for ten (10) 12” X 20” X 2 ½” pans.
10. Electronic spark ignition
11. Fan-less high velocity steam distribution system with brass steam jets.
13. Water filtration system
14. Three year warranty for parts, labor and mileage.

Approved Manufacturers: Cleveland, Model 24-CGA10.2, or pre-approved equal.

ITEM 92 TRUNNION KETTLE, SINGLE, GAS (1)

ITEMS # 92, #91 MUST BE PROVIDED BY SAME MANUFACTURER

Provide kettle with following features:
One 6-gallon kettle on self-contained modular base with drain trough.

1. Kettle steam jacket permanently filled with treated distilled water. Venting and/or refilling not required.
2. Kettle to be 2/3 steam jacketed, type 304 stainless steel kettle and supports.
3. Manual tilting, balanced design with mounting lugs on both sides, centered pouring lip.
4. 50 PSI steam jacket ration, provided with safety and control valves.
5. Nickel-guard coating that resists scale and corrosion.
7. Console mounted controls, pressure gauge, illuminated “Start/Reset” control switches.
8. Solid State water level steam generator controls.
10. Automatic water fill on start-up
12. Provide kettle lift-off cover and double pantry faucet.
14. 5-year boiler warranty

Approved Manufacturers: Cleveland Model KGT-6, or pre-approved equal. Revised 7-20-06, Revised 5-15-15

ITEM 93 TABLE, WORK (WITH SINK) QUANTITY AS SCHEDULED

This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Table is to include under-shelf and drawer SINK MUST BE LOCATED AT END OF TABLE. Approved Manufacturers: Select Stainless, Universal, and Low Temp.

ITEM 94 TABLE, SOILED DISH QUANTITY AS SCHEDULED

This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Approved Manufacturers: Select Stainless, Universal, and Low Temp.
APPENDICES

ITEM 95 TABLE, CLEAN DISH QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and
with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Approved
Manufacturers: Select Stainless, Universal, and Low Temp.

ITEM 96 TABLE, WORK QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and
with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf
and locking wheels. Table is to be 60” or 72” long, per drawings. Approved
Manufacturers: Select Stainless, Universal, and Low Temp.

ITEM 97 TABLE, COOK’S (W/POT RACK AND SINK) QUANTITY (1)
This item to be custom fabricated in accord with General Requirements of specifications and
with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer and under

ITEM 98 TABLE, WORK QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and
with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer and
under shelf. Approved Manufacturers: Select Stainless, Universal, and Low Temp.

ITEM 99 TABLE, BAKER QUANTITY AS SCHEDULED
This item to be custom fabricated in accord with General Requirements of specifications and
with plan and detail drawings, and is to be constructed with 14-gauge stainless steel.

A. 14 gauge 304 stainless one piece, seamless stainless steel top, with 6”high integral riser on back and ends
with coved corners. Overall size 30” X 72” long
B. Stainless steel over-shelf, 16-gauge 304 stainless steel, with rear and ends flared up 2”. Height of shelf
AFF is 54”.
C. Stainless steel legs fitted at top with fully enclosed stainless steel gussets welded to underbracing and at
bottom, with adjustable stainless steel bullet feet. Front rail omitted on open base section to allow for
ingredient bins.
D. Provide three (3) roller bearing drawers mounted on right side, 20” X 20” X 5”, 18–gauge stainless steel
coved corner body, set in stainless steel channel frame and having stainless
steel roller slides.
E. All joints ground and polished to match adjoining surfaces. Sound deaden underside of top.
F. NSF approved.
Approved Manufacturers: Universal Stainless, Select Stainless, Low Temp Industries

ITEM 100 NOT USED

ITEM 101 VENT DUCT SET
To be custom fabricated in accord with General Requirements of specifications and with plan
and detail drawings.
Approved Manufacturers: Universal Stainless, Select Stainless, Low Temp Industries

ITEM 102 WALL SHELF QUANTITY AS SCHEDULED
APPENDICES

This item to be custom fabricated in accord with General Requirements of specifications and with plan
Approved Manufacturers: Universal Stainless, Select Stainless, Low Temp Industries

ITEM 103 WARMING CABINET, PASS THRU QUANTITY AS SCHEDULED Provide one-section pass-through hot cabinet, having the following features. Items 76, 77, and 103 must be provided by the same manufacturer.
A. Half-height doors hinged as shown on drawings.
B. Stainless steel exterior and interior.
C. Removable, universal pan slides, each half-door section. D. Voltage characteristics as scheduled.
E. Set of adjustable stainless steel legs
F. Customized stainless steel trim strip to seal cabinet to adjacent building surfaces.
G. Install cabinet so controls face kitchen. H. External thermometer
I. Top housing to match refrigerator cabinet.
Approved Manufacturers: Traulsen RHF132WP-FHS, Delfield SLH-PT-29SS, Victory
Revised 03-1-12, Revised 5-15-15

ITEM 104 WARMER CABINET/PROOFER, MOBILE (3) Provide mobile heater/proofer cabinet having the following features: A. All stainless steel construction
B. 20 Amp plug with 8’ wire.
C. Universal Tray Slides to hold 14 bun pans or 28 steam table pans
D. Maintains temperatures from 85° F to 180° F
E. Circulating fan to maintain even temperature throughout cabinet, as well as speed initial warm-up and recovery times
F. External thermometer
G. Dutch Doors
H. Bottom mounted water pan with minimum 2-gallon capacity. No exposed heating elements
I. 5” locking casters
J. Full perimeter bumper
Approved Manufacturers: CresCor H-137-WSUA-12D-15A, Metro C-5 9 Series, Winston

ITEM 105 WARMER, 2-DRAWER (2)
Provide 2-drawer warmer having the following features:
A. All stainless steel construction. B. Cord and plug.
C. Drawers to accept two full steam table pans. D. Electronic differential controls.
E. Controlled vapor technology. F. External thermometer.
G. Full perimeter insulators. H. Bottom mounted water pan.
I. Built into Beverage Counter, Item 20, see detail drawings. J. Electrical characteristics as scheduled.
Approved Manufacturers: Winston HBB0D2, or pre-approved equal.
APPENDICES

ITEMS 106-117 NOT USED

ITEM 118 STAINLESS STEEL UTILITY CHASE (1)
Provide island utility chase to serve items under exhaust hood, having the following features:
A. Stainless steel construction. B. UL label.
C. Designed to include electrical wire way.
D. Water tight electrical receptacles to match equipment.
E. 1 1/2" gas manifold with tees and shut-off valves.
F. 1/2" hot water and cold water manifold with tees and shut-off valves.
G. Gas and water quick disconnects and appropriate cord and plug sets as required by equipment for installation under Division 15 and 16.
H. Manual gas shut-off valve for installation under Division 15.
I. Length as shown on drawings, with utilities coming from above.
J. Mount switches for pre-starter and hood lights in end riser, approximately 48" above the floor.
Approved Manufacturers: Avtec Model ILUW, Captive-Aire, or pre-approved equal.

ITEM 122 PREP TABLE, MOBILE
This item to be custom fabricated in accord with General Requirements of specifications and with plan and detail drawings, and is to be constructed with 14-gauge stainless steel. Provide drawer, under-shelf and locking wheels. Table is to be 48" long.
Approved Manufacturers: Universal Stainless, Select Stainless, Low Temp Industries

ITEM 123 PAPER TOWEL DISPENSER - QUANTITY AS SCHEDULED
Locate directly above all hand sinks in cafeteria areas: A. Self-locking.
B. Holds 2-packages of single-fold towels. C. Stainless steel finish.
Approved manufacturer: Atlantic Corporation Model U-190, or pre-approved equal

ITEM 126 SECURITY STORAGE CABINET QUANTITY AS SCHEDULED (MINIMUM 3)
A. Chrome wire construction.
B. Heavy duty platform bottom with bumper around frame.
C. Double door front with full height latch bar suitable for padlock. D. Three intermediate shelves, adjustable.
E. Corner posts. F. Enclosed top. G. Plate casters.
H. Overall size: 28" x 63" x 68" high.
Truck to be as manufactured by Metro, Model SEC56C, or pre-approved equal.

ITEM 128 BEVERAGE COUNTER (1)
A. Fabricate and provide a counter to be size and shape as shown on plan. Top to be of 14 gauge stainless steel, one piece construction with all sides turned down 2" on 90°, tight against the body. Top to be cut out to receive the equipment detailed and made with a minimum of field joints. Provide grommets as necessary for counter top electrical cords. Counter to have top cut out to receive ice cream cabinet.
B. Framework to be 1-1/2" x 1-1/2" x 1/8" galvanized angles, electrically welded, welds ground smooth and coated with a rust inhibiting finish. There are to be die formed heavy galvanized steel channel member where required to support counter top equipment. Channel members located to accommodate legs.
C. Body enclosed with 20 gauge stainless steel panels secured to the angle frame. Front aprons, panels and trims to be 18 gauge stainless steel. High-pressure laminate to be applied to front panels. Color to be selected by Architect.

D. Front legs to be 6" polished stainless steel with stainless steel adjustable feet. Legs shall be bolted to the framework. There is to be a removable toe kick, faced with a black high pressure plastic laminate. Rear legs to be stainless steel with adjustable flanged feet for securing to the floor.

E. Counter top to have stainless steel swinging gate for access as shown on fabrication drawings.

F. See fabrication drawings for details.

Approved manufacturer: Universal Stainless, Select Stainless Steel, Low Temp Industries

THIS CONCLUDES HIGH SCHOOL EQUIPMENT SPECIFICATIONS
27.2.1 Sound System Diagrams (1 of 3)
APPENDICES

27.2.1 Sound System Diagrams (1 of 3)
27.2.1 Sound System Diagrams (1 of 3)
28.1.5 Door Access Control
31.3.3 Playground Drainage

General Notes

1. Contraction joints shall be spaced at 10' intervals. Contraction joints may be installed by the use of templates or formed by other approved methods. Minimum of 1" depth. Fill contraction joints with joint sealer.

2. Expansion joints shall be spaced at 90' intervals and adjacent to all rigid objects.

3. Concrete shall be at least 4000 PSI.
APPENDICES

32.1.17 Vehicle Gate

Notes:
1. Gates shall include double keep lock to secure posts. Keepers shall be 2" Schedule 40 steel post welded to main post at 60" from closed position. Provide adjustable double lock keeper at each gate post.
2. All metal surface to be galvanized (K-90) and not painted.
3. Contractor shall install a Knox Padlock and CMS Lock at all vehicle access gates on site.
4. Contractor shall provide shop drawings for review.
APPENDICES

32.8.3 Dumpster Enclosure

Provide three bays at ES, KS, and MS.
Provide five bays at HS.

8' tall welded steel frame gate with chain link and privacy slats.

8' tall masonry screen wall with brick veneer.
Cap of wall to match building parapet cap.

6" steel bollard to 3'-6" tall. Fill bollards with concrete and round off cap, typ.
32.9.1 Skinned Infield

Soil mixture shall be 60% clay and 40% sand with surface conditioner.

Finish Grade

Compacted Subgrade
APPENDICES

33.3.3 Site Plumbing for Mobiles

[Diagram showing plumbing connections including copper line to meter, backflow preventer, 2" PVC to mobile restroom vault, copper tee, and copper line to main building.}

School
APPENDICES

27.11.27 MDF Detail (1 - 3)

APPENDIX 1

[Diagram showing electrical and structural details with annotations for conduits, racks, and fire-rated plywood]
12" LADDER RACK
MOUNT FLUSH TO TOP OF
DATA RACKS UTILIZING 6"
RUNWAY ELEVATION KITS.

MC
WDF

18" LADDER RACK AT 6'-6"
AFF. PROVIDE WIDE
Sweeping turns. PROVIDE
AND UTILIZE WATERFALL
DEVICES TO TRANSITION FROM
THE LADDER RACK ABOVE TO
THE LADDER RACKS BELOW.
APPENDICES

27.11.27  MDF Detail (1 - 3)

APPENDIX 3

GENERAL NOTES:
1. FEED ALL CABLES INTO RACKS FROM ABOVE.
2. LEAVE ONE RACK UNIT SPACE FREE ABOVE AND BELOW EACH PATCH PANEL WIRE MANAGER AND OWNER PROVIDED NETWORK ELECTRONICS. FILL THESE SPACES WITH BLANK PANELS.

KEYED NOTES:
1. HORIZONTAL GROUND BUS BAR, 1 RU TYPICAL
2. POWER STRIP 30A, 2 RU TYPICAL
3. FIBER ENCLOSURE, 2-4 RU TYPICAL
4. HORIZONTAL WIRE MANAGER, 2 RU TYPICAL
5. 48 PORT ANGLED PATCH PANEL-DATA, 2 RU TYPICAL
6. NETWORK SWITCH PROVIDED AND INSTALLED BY OWNER, 1 RU TYPICAL
7. POWER STRIP 20A, 1 RU TYPICAL
8. 24 PORT TELCO PATCH PANEL WITH SINGLE RJ21X CONNECTION. CONNECT AT&T DEMAND TO THIS PATCH PANEL VIA 25-PAIR WIRE TO FEMALE AMPHENOL CABLE.
9. 24 PORT ANGLED MODULAR PATCH PANEL WITH WHITE JACKS FOR SECURITY TERMINATIONS, 1 RU TYPICAL
10. 24 PORT ANGLED MODULAR PATCH PANEL WITH GREEN JACKS FOR VOICE BACKBONE, 1 RU TERMINATE 25-PAIR CATEGORY 3 FEEDERS FROM MC TO EACH TR. ROLL BACK THE 25TH PAIR. PROVIDE ONE PATCH PANEL FOR EACH TR. TYPICAL
11. 24 PORT ANGLED MODULAR PATCH PANEL WITH YELLOW JACKS FOR WIRELESS ACCESS POINTS TERMINATIONS, 1 RU TYPICAL
12. 7' FLOOR MTD DATA RACK
13. DATA RACK #1 FIBER/COPPER ELECTRONICS
14. DATA RACK #2 FIBER/COPPER ELECTRONICS & FUTURE
15. DATA RACK #3 SERVICE PROVIDERS
16. DATA RACK #4 SECURITY

DATE: 7/2017
DRAWN BY: WP
CHECKED BY: WP
ISSUE DATE: 7/2017

MDF DATA RACKS ELEVATION
T-011
27.1.11.28 IDF (4 - 6)

APPENDICES

APPENDIX 5

18" LADDER RACK AT 8'-6" AFF PROVIDE WIDE SWEEPING TURNS PROVIDE AND UTILIZE WATERFALL DEVICES TO TRANSITION FROM THE LADDER RACK ABOVE TO THE LADDER RACKS BELOW.

12" LADDER RACK, MOUNT FLUSH TO TOP OF DATA RACKS, UTILIZING 6" RUNWAY ELEVATION KITS.
APPENDICES

27.11.28 IDF (4 - 6)

APPENDIX 6

GENERAL NOTES:
1. FEED ALL CABLES INTO RACKS FROM ABOVE.
2. LEAVE ONE RACK UNIT SPACE FREE ABOVE AND BELOW EACH PATCH PANEL, WIRE MANGER AND OWNER PROVIDED NETWORK ELECTRONICS. FILL THESE SPACES WITH BLANK PANELS.

KEYED NOTES:
1. HORIZONTAL GROUND BUS BAR, 1 RU, TYPICAL
2. POWER STRIP 30A, 2 RU.
3. FIBER ENCLOSURE, 1 RU.
4. HORIZONTAL WIRE MANAGER, 2 RU, TYPICAL
5. 48 PORT ANGLED PATCH PANEL-DATA, 2 RU, TYPICAL
6. NETWORK SWITCH PROVIDED AND INSTALLED BY OWNER, 1 RU, TYPICAL
7. POWER STRIP 20A, 1 RU, TYPICAL
8. 24 PORT ANGLED MODULAR PATCH PANEL WITH GREEN JACKS FOR VOICE BACKBONE, 1 RU. TERMINATE 25-PAIR CATEGORY 3 FEEDERS FROM MD TO EACH TR. ROLL BACK THE 25TH PAIR. PROVIDE ONE PATCH PANEL FOR EACH TR. TYPICAL
9. 24 PORT ANGLED MODULAR PATCH PANEL WITH YELLOW JACKS FOR WIRELESS ACCESS POINT TERMINATIONS, 1 RU, TYPICAL
10. 24 PORT ANGLED MODULAR PATCH PANEL WITH WHITE JACKS FOR SECURITY TERMINATIONS, 1 RU, TYPICAL
11. 7" FLOOR MTD DATA RACK
12. DATA RACK #1 FIBER/COPPER ELECTRONICS
13. DATA RACK #2 VOICE SECURITY & FUTURE

DATE: 7/28/17
DRAWN BY: WP
CHECKED BY: WP
ISSUE DATE: 7/28/17

IDF DATA RACKS ELEVATION
T-012
### APPENDIX 7

#### 27.1.18.3 Cabling Design Standards

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<th>Comments</th>
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*Notes: TY = Tycon.*
## APPENDICES

### 27.1.18.3 Cabling

#### APPENDIX 7

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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversation Stands</td>
<td>NA</td>
<td>NA</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Provide contact to field office for future</td>
</tr>
</tbody>
</table>

#### Media Center

<table>
<thead>
<tr>
<th>Room/Designation</th>
<th>Elementary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Secondary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Notes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Center</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>8</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TV/monitor at instruction walls (2: COAX AT 18&quot;) with a data near circulation desk</td>
<td></td>
</tr>
<tr>
<td>Media Center Office</td>
<td>4</td>
<td></td>
<td></td>
<td>8</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AB600 in field</td>
<td></td>
</tr>
<tr>
<td>TV Studio</td>
<td>3</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Add cable to COAX and D1 on adjacent wall. TV/OUT AT 18&quot;</td>
<td></td>
</tr>
<tr>
<td>Video Conference Room</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>TV/monitor on instructional wall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maker Space</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TV/monitor on instructional wall</td>
<td></td>
</tr>
</tbody>
</table>

#### Miscellaneous Spaces

<table>
<thead>
<tr>
<th>Room/Designation</th>
<th>Elementary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Secondary</th>
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<th></th>
<th></th>
<th></th>
<th>Notes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipurpose Room</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Studio TV on stage thenVFSTV on stage behind curtain</td>
<td></td>
</tr>
<tr>
<td>Storage Room</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASEP Loud Box</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coordinating location with school personnel. TYPICALLY MULTIPURPOSE MOUNTED WIDE</td>
</tr>
</tbody>
</table>

#### Cafeteria

<table>
<thead>
<tr>
<th>Room/Designation</th>
<th>Elementary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Secondary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Notes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cafeteria/Lounge</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Add one D1 for each POS and one D1 for each menu board. These cables route directly back to the POS</td>
<td></td>
</tr>
<tr>
<td>Cafe Mains Office</td>
<td>2</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Add POS outlets for POS and menu board casual routing back to the space</td>
<td></td>
</tr>
</tbody>
</table>

#### Building Support

<table>
<thead>
<tr>
<th>Room/Designation</th>
<th>Elementary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Secondary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Notes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler Room</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For HVAC system</td>
<td></td>
</tr>
<tr>
<td>Mechanical Room</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connected directly to elevator equipment</td>
<td></td>
</tr>
<tr>
<td>Exhaust Control Room</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Directly to exhaust panel (2P travels to D1 header</td>
<td></td>
</tr>
<tr>
<td>Main Equipment Room</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Directly to exhaust panel (2P travels to D1 header</td>
<td></td>
</tr>
<tr>
<td>Intermediate Telecom Room</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Directly to exhaust panel (2P travels to D1 header</td>
<td></td>
</tr>
<tr>
<td>Main Elevator Room</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Directly to exhaust panel (2P travels to D1 header</td>
<td></td>
</tr>
</tbody>
</table>

## CMS 3 DROP COUNT STANDARDS 3/16/2015 REV 1
27.18.4 Example Designs (8 - 17)

Sheet Notes:

- PROVIDE RECESSED WALL OUTLET (MOUNTED IN WALL) AND FACEPLATE.

APPENDIX 8

Small Diagram with labels:
- Elementary Classroom
- Instructional Wall
- Teacher
- Future
- AP
- CR Cam
- In-Wall Outlet

Revisions:
- Date: 7/2017
- Drawn By: WP
- Checked By: WP
- Issue Date: 7/2017

Elementary Classroom Typical

T-100
27.1.18.4 Example Designs (8 - 17)

Sheet Notes:

* PROVIDE RECESSED WALL OUTLET (MOUNTED IN WALL) AND FACEPLATE.

APPENDICES

APPENDIX 9

INSTRUCTIONAL COMPUTER LAB

TEACHER

INSTRUCTIONAL WALL

IN WALL OUTLET

FUTURE

CRICKET

(3) 2°C, BY E.C.

DATE: 7/2017

DRAN BY: WP

CHECKED BY: WP

ISSUE DATE: 7/2017

T-101

INSTRUCTIONAL COMPUTER LAB
27.1.18.4 Example Designs (8 - 17)
27.1.18.4 Example Designs (8 - 17)
27.1.18.4 Example Designs (8 - 17)
APPENDICES

27.1.18.4 Example Designs (8 - 17)
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27.1.18.4 Example Designs (8 - 17)
APPENDICES

27.1.18.4 Example Designs (8 - 17)

Sheet Notes:

1. PROVIDE RECESSED WALL OUTLET (MOUNTED IN WALL) AND FACEPLATE.