DIVISION 11 – EQUIPMENT

This division contains the following elements:

1.1 General.
1.2 Book Theft Detection System.
1.3 Stage Curtains.
1.4 Washers and Dryers.
1.5 Projection Screens.
1.6 Food Service Equipment.
1.7 Utility Distribution and Canopy Ventilating Systems.
1.8 Food Service Shelving.
1.9 Gymnasium Equipment.
1.10 Kilns.
1.11 Dust Collection Systems.
1.12 Laboratory Equipment.

1.1 GENERAL

A. Comply with the following:
   1. Florida Building Code (FBC).

B. Quality of materials, shop drawing reviews, equipment integrity and installation shall be a major concern of the A/E, as M-DCPS does not normally receive replacements for as long as thirty years.

C. Building construction quality in food storage, preparation, and serving areas is extremely important. Strive to eliminate gaps between building materials that would allow pests access through floors, walls, or roofs.

D. Equipment and its installation shall be UL listed, if applicable.

E. Installers, service personnel, and contractors for new or existing equipment using refrigerant shall comply with Environmental Protection Agency (EPA) regulations regarding technician certification and recycling/recovery equipment. See Division 15.

1.2 BOOK THEFT DETECTION SYSTEM

A. Provide for book theft detection systems at student entrances and exits to K-8 centers, middle and high school media centers.

B. Book theft systems include detection sensors, and sensing screens.

C. Comply with the following:
   1. Use of electronic low energy field between sensing screens shall provide for absolute discrimination, with no false alarms for three ring binders, metal rimmed briefcases, wire bound notebooks, calculators and other commonly carried objects. Coordinate locations for sensing screen recessed power requirements.

2. Detection sensors shall be small, thin, flexible and pressure sensitive, and shall not lose sensitivity.
3. Sensing equipment capable of damaging or interfering with magnetic media, wristwatches, hearing aids, heart pacemakers or similar items is prohibited.
4. System operation shall not require the display of warning signs saying the detection system may affect certain types of heart pacemakers.

1.3 STAGE CURTAINS

A. See FBC and program requirements for curtains at auditoriums, cafeterias, language arts labs (little theaters) and the media center CCTV production rooms.

B. Curtain fabrics shall be flame resistant according to FBC requirements and NFPA requirements. A sewn-on permanent label shall name the manufacturer and state that the fabric is non-combustible.

C. Provide a minimum of 50 percent additional fullness and box pleats. Provide double bottom hems, canvas chain pocket and chains at full-length curtains.

D. Provide heavy-duty steel tracks and battens with support assemblies not exceeding 6'-0" on center.

E. Provide a pipe grid the full length of the proscenium opening plus 5'-0"at each side as shown in Design Criteria Appendix – Stage Drawings. The pipe grid shall be at 4 feet on center for hanging the longitudinal battens for the curtain tracks and lighting.

F. Stage curtains shall include:
   1. House (Grand) Curtain:
      a. Center bi-parting curtain with manual pulley operation, hung 8 inches behind the front hard wall for the full length of proscenium opening plus 3'-0" at each side.
      b. Two-way traversing, heavy-duty, steel track and accessories.
      c. Polyester velour fabric of a solid school color or other colors as approved by M-DCPS.
   2. House Valance:
      a. Stationary valance designed to conceal the house curtain tacks and lighting pipe grid. Hang 4 inches behind the front hard wall and extend 18 to 24 inches below and 6 inches above the proscenium for the full length of proscenium opening plus 1'-6" at each side.
      b. Polyester velour fabric the same color as the house curtain.
      c. School initials or monogram may be sewn on the valance.
   3. Leg Curtains:
      a. Black polyester fabric, full-length curtains on stationary battens.
      b. 6'-0" length with 2'-0" on stage and 4'-0" off stage.
   4. Border Curtains:
      a. Black polyester fabric curtains on stationary battens located in front of leg curtains.
      b. Provide border curtains with an overall height as the house valance for the full length of the proscenium opening plus 6'-0" at each side.

5. Travelers:
    a. Black polyester fabric, full-length, center bi-parting curtain with manual pulley operation.
    b. Stack stage right and left with 2'-0" remaining on stage.
6. Backwall Curtain:
    a. Black polyester fabric, full-length, center bi-parting curtain with manual pulley operation.
    b. Full-length proscenium opening plus 4'-0" at each side.
7. Backwall Valance:
    a. Black polyester fabric valance on a stationary batten.
    b. Provide backwall valance with an overall height as the house valance for the full length of the proscenium opening plus 4'-0" at each side.
8. Cyclorama:
    a. Light blue polyester fabric suitable for theater light projection.
    b. A stretched and taut curtain, at the rear of the stage, with an overall height as the house valance for the full length of the proscenium opening plus 4'-0"at each side.

1.4 WASHERS AND DRYERS

A. Provide washing machines and clothes dryers in food service areas, locker rooms and vocational instructional spaces according to program requirements and the following:
    1. Residential washers and electric dryers for student use in the home economics classrooms.
    2. Residential washers and electric dryers for staff use in the food service laundry room area serving elementary schools, K-8 centers, middle learning centers (MLCs), middle schools and senior high schools.
    3. Stacking washers and dryers in Early Childhood Centers (ECCs) and Primary Learning Centers (PLCs).
    4. Fifty-pound capacity commercial washers and gas dryers complete with lint traps, for staff use in high school physical education laundry rooms.
    5. All washers and dryers shall be placed on a 4 inch high raised concrete housekeeping platform matching the finish floor material (including the sides) and the minimum equipment footprint.

B. Dryers shall be vented to the exterior and the exhaust ducts shall be concealed within an adjacent partition or chase.

1.5 PROJECTION SCREENS

A. Stage movie screens shall be as follows:
    1. 15 feet by 15 feet, of a durable, matt white, fireproof viewing surface.
    2. Stage movie screens shall be electrically-operated roll-down.
    3. Locate directly behind the house curtain, concealed from view in roll-up position, centered on the stage.

B. For large Cafetoriums, confirm with M-DCPS Facilities Design and Standards the need to provide two (2) 9'-0" high x 12'-0" wide electrically operated projection screens, one (1) on each side of the stage proscenium opening. When it is determined by M-DCPS that these screens are necessary, provide the following:

1. Screens shall be matt white, fireproof and mildew resistant. Screens shall be model "Targa" as manufactured by Draper Inc., or approved equal.
2. Screens shall be mounted recessed with ceiling and shall be fully concealed from view when in the rolled-up position and shall be placed so as to maximize the view angle from the entire dining room area.
3. Provide two (2) multi-station control switches for each screen. Location of the control switches shall be in accordance with the Educational Specifications for each project.
4. Provide all necessary power, data and communications conduits to support the installation of one (1) Not-In-Contract (NIC) ceiling mounted digital projector for each screen (total of two). See the "Stage" section of the Educational Specifications for details.

C. Provide projection screens in other areas as may be required by the Educational Specifications.

1.6 FOOD SERVICE EQUIPMENT

A. General:
1. For most facilities, the food service equipment lists will be identified in M-DCPS Master Specifications and the Educational Specifications developed for the projects. Additional equipment or different models of the equipment listed may be required to accommodate special program requirements. Consult with M-DCPS Food and Nutrition, to verify equipment selection before design layout at 7042 West Flagler Street, telephone, (786) 275-0400.
2. Use foam expanding agents and refrigerants not contributing to the depletion of the earth's protective ozone layer.
3. Equipment shall be listed by Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratory (NRTL) recognized by OSHA.
4. Specify that the Contractor is responsible for disconnecting and moving equipment to designated M-DCPS storage facilities or as otherwise directed at kitchen renovations involving existing equipment removal.
5. Kitchen plumbing drawings shall be coordinated with food equipment and counter layout.
6. Kitchen Floor Drains: See Division 15 for kitchen drain requirements.
7. Use easily cleanable materials in food service areas. Components such as "Unistrut" or other similar fabrications are not allowed.
8. Where cafeteria kitchen projects specify roll-thru heated and refrigerated equipment behind the serving area, the designer shall allow for adequate space to open the doors and remove pans without impeding the circulation and creating a potential safety hazard.
9. Specify that the Contractor is to keep all stainless steel equipment tables, sink tables and serving lines completely covered and protected to avoid scratches from tools and machinery during construction. Specify that the contractor shall buff out all scratches prior to Substantial Completion.
10. Specify foot pedal operated hand sinks in lieu of electric or battery operated hand sinks.
11. Specify paper towel and soap dispensers at all hand sinks.
12. Specify that the floor area under the serving lines and roll-thru heated/refrigerated units shall be level.
13. Specify that floor drains be placed so that water does not pond in any area.

14. Specify that a “flood test” be performed to assure that there is no ponding in any area.
15. Specify that all stub-ups and floor drains must be placed and installed so that they are not a trip hazard.
16. Specify proper curbing around all stub ups and floor mounted electric and data boxes in the food service areas.
17. Specify that the contractor is to provide all of the keys for the drawers and all the equipment manuals for the Food Service Manager when the project achieves Substantial Completion.

B. Trash Compacting System:
1. Dining rooms shall be provided with trash compactor alcove(s) in accordance with the Educational Specifications for the project.
2. Each trash compactor alcove shall be 8'-0" wide x 5'-0" deep x 9'-0" minimum height. Provide an 8'-0"wide x 8'-0" high overhead coiling door at the entrance of each alcove. Alcove shall have the same finishes as the dining room. Provide one (1) dedicated 120V duplex outlet, located 4'-0" AFF, on one sidewall of the alcove to provide power to the NIC compactor.
3. Provide a convenient route, not through the kitchen, from the compactors to a service yard dumpster.
4. See the Educational Specifications for compactor sizes and quantities.

C. Walk-in Cooler/Freezer:
1. Insulated cold storage rooms are prefabricated, foamed-in place, free standing walk-in rooms, designed for easy, accurate, indoor on-site assembly over a recessed slab.
2. Refrigeration system components include a fully automatic outdoor air-cooled condensing unit and a ceiling mounted evaporator unit in the refrigerated room.
3. Prefabricated floor, ceiling and wall sections shall contain at least 4 inches of insulation.
4. The walk-in cooler and freezer shall have an interior and exterior 0.040-inch aluminum skin, embossed to a stucco-like profile and finished with enamel on the finish side. Heat strips shall be furnished around the cooler and freezer doors. The cooler and freezer doors shall be provided with view windows and 30-inch high diamond-pattern aluminum kick-plate from side to side on both sides. An air-curtain shall be furnished at the cooler door. The cooler and freezer shall have a quarry tile floor installed onsite, flush with the kitchen quarry tile flooring. The concrete slab shall be recessed to accommodate the flush quarry tile installation. The cooler and freezer shall have a heavy sheet of aluminum above the flooring insulation, appropriately recessed to receive the quarry tile.
5. Stainless steel finish floor overlay panels shall be used only at a renovation project without a depressed slab.
6. Cold storage room floors shall be designed to carry 600 pounds per square foot loading and be finished with quarry tile.
7. Doors:
    a. The freezer door shall open into the cooler and the cooler door shall open into the kitchen.
    b. Provide vision panels in the cooler door and the freezer door.
    c. Doors shall be self-closing.
8. Provide wet-trap floor drains for condensate.

9. The walk-in cold storage and frozen storage shall have a minimum clear ceiling height of 7'-10".

D. Custom Fabricated Food Service Equipment:
   1. At food service areas, provide the following custom-fabricated stainless steel equipment in accordance with the Educational Specifications, including all necessary accessories:
      a. Cook's table with 1 compartment sink, overhead utensil rack, overhead shelf and drawers on each end.
      b. Baker's table with 1 compartment sink, overhead utensil rack, overhead shelf and drawers on each end.
      c. Vegetable/salad sink, 2 compartments.
      d. Pot washing sink, 3 compartments with overflow/scraping compartment.
      e. Worktables wired for electric with outlets.
      f. Utensil/pot racks shall be mounted to the two-compartment and three-compartment sinks at a height that is practical for the average 5'-5" food service employee.
      g. Serving counters/bays (built-in for interior bays except traditional lines) Middle Schools and Senior High Schools)
      h. All worktables that contain a sink shall be provided with an overhead utensil rack, overhead shelf and drawers on each end.

E. Serving Line Equipment:
   1. Serving line aisle widths shall be at least 42 inches wide.
   2. Fronts of serving lines equipment shall be designed with stainless steel or decorative laminated panels with stainless steel corner-guards.
   3. Each Traditional Serving Line (Interior) shall consist of the following:
      a. Self-serve Milkbox (The size to be determined by the project specific Educational Specifications). Provide floor drain near unit and connect as needed.
      b. Custom fabricated electric hot food unit with openings to fit 12" x 20" x 6" cafeteria steam table pans. Each opening to provide dry/moist heat with manual fill faucet. (The number of openings to be determined by the project specific Educational Specifications). Double heated storage section with storage inserts to hold pans located under hot well section. Protector case with Plexiglass front and ends installed over hot food section with incandescent light using shatterproof bulbs. Dome cover with integral handle shall be provided for each hot well section. Provide floor drain near unit and connect as required.
      c. Custom fabricated cold section with flush mounted frost top and drain trough. Self-contained refrigerated storage section with two removable shelves. Two-tier display case with Plexiglass shelves front and sides located over frost top section.
      d. Solid tray slide with three (3) die-formed inverted ridges to be installed the entire length of line with exceptions of mild box.
      e. Point of Sale (POS) Cashier stand with footrest, cashier drawer and electrical and data routed to underside of cashier station so students or employees cannot trip of kick them. See Design Criteria Division 13 "Telephone Dada Systems" section for details on POS data wiring requirements.
      f. Other equipment in accordance with the Educational Specifications.
   4. Each Interior Food Court Style serving line shall consist of the following:

a. Drop-in electric air-cooled refrigerated section (The size to be determined by the Educational Specifications) Two-tier display case with Plexiglass shelves, front and sides located over refrigerator section.
b. Custom fabricated electric hot food unit with openings to fit 12" x 20" x 6" cafeteria steam table pans. Each opening to provide dry/moist heat with manual fill faucet. (The number of openings to be determined by the Educational Specifications). Double heated storage section with storage inserts to hold pans located under hot well section. Protector case with Plexiglass front and ends installed over hot food section with incandescent light using shatterproof bulbs. Dome cover with integral handle shall be provided for each hot well section. Provide floor drain near unit and connect as required.
c. Custom fabricated cold section with flush mounted frost top and drain trough. Self-contained refrigerated storage section with two removable shelves. Two-tier display case with Plexiglass shelves front and sides located over frost top section.
d. Solid tray slide with three (3) die-formed inverted ridges to be installed the entire length of line with exceptions of mild box.
e. Point of Sale (POS) Cashier stand with footrest, cashier drawer and electrical and data routed to underside of cashier station so students or employees cannot trip of kick them. See Design Criteria Division 13 "Telephone Dada Systems" section for details on POS data wiring requirements.
f. Other equipment in accordance with the Educational Specifications

5. Each Exterior Food Court Style serving line shall consist of the following:
   a. Custom fabricated stainless steel serving counter to hold counter top hot/cold equipment according to program requirements.
   b. Custom fabricated electric hot food unit with openings to fit 12" x 20" x 6" cafeteria steam table pans. Each opening to provide dry/moist heat with manual fill faucet. (The number of openings to be determined by the Educational Specifications). Double heated storage section with storage inserts to hold pans located under hot well section. Protector case with Plexiglass front and ends installed over hot food section with incandescent light using shatterproof bulbs. Dome cover with integral handle shall be provided for each hot well section. Provide floor drain near unit and connect as required.
   c. Custom fabricated cold section with flush mounted frost top and drain trough. Self-contained refrigerated storage section with two removable shelves. Two-tier display case with Plexiglass shelves front and sides located over frost top section.
6. Theme Package Lines (Primary Learning Centers and Early Childhood Centers) shall include the following:
   a. Custom fabricated stainless steel serving counter to hold counter top hot/cold equipment according to program requirements.
   b. Custom fabricated electric hot food unit with openings to fit 12" x 20" x 6" cafeteria steam table pans. Each opening to provide dry/moist heat with manual fill faucet. (The number of openings to be determined by the project specific Educational Specifications). Double heated storage section with storage inserts to hold pans located under hot well section. Protector case with Plexiglass front and ends installed over hot food section with incandescent light using shatterproof bulbs. Dome cover with integral handle shall be provided for each hot well section. Provide floor drain near unit and connect as required.

c. Custom fabricated cold section with flush mounted frost top and drain trough. (approx. 60 inches long x 34 inches high). Self-contained refrigerated storage section with one removable shelve and one-tier display case with Plexiglass shelves front and side located over frost top section.
d. Solid tray slide with three (3) die-formed inverted ridges to be installed the entire length of line with exceptions of mild box.
e. Utility station (± 46 inches long x 34 inches high) with under storage.
f. Theme Package.

F. Food Preparation, Holding and Dispensing Equipment:
1. Food preparation equipment includes, but is not limited to:
a. Floor mounted 60-quart mixer with a power bowl lift. (See M-DCPS Master Specification Guidelines for accessory list).
b. The In-Contract (IC) Ice Maker shall be equipped with a water filter and shall have the following daily production capacities:
1) Primary Learning Centers (PLC) and Early Childhood Centers (ECC): 200 lbs.
2) Middle Learning Centers (MLC): 400 lbs.
3) Elementary schools: 500 lbs.
4) Middle Schools, K-8 Centers and Senior High Schools: 750 lbs.
c. Mobile Food Storage and Dispenser Racks.
d. Stationary Food Storage and Dispenser Racks.
e. Inclined Can Rack.
f. High Density Track Shelving according to the Educational Specification of the Project.
g. Roll-thru refrigerated units. (Provide roll-in units when placed against a wall)
h. Roll-thru heated units. (Provide roll-in units when placed against a wall)

G. Cooking Equipment:
1. Cooking equipment for food service shall include, but not be limited to, the following:
a. Double stack convection ovens, double compartment with filter system.
b. Double-stacked convection oven with added steam injection system and porcelain steel liners, stainless steel doors with glass panels and stainless steel front, left side, right side, top and back panels. Unit shall have multiple programmable settings and be easy to use, clean and service. Unit shall be Garland Moisture Model No. MP-GS-10/20-S, DOYLON Model No. JAOP6LG/JAOP6G, or approved equal.
c. Convection steamer, double compartment with filter system.
d. Steam Kettle: Stainless steel unit, gas fired, complete with hot and cold water and filter system.
e. Electric heavy-duty 2-burner range with polished stainless steel cabinet base, 6-inch stainless steel legs and adjustable bullet feet.

2. Cooking equipment for Instructional Food Lab Commercial Cooking Center:
a. Convection Oven: Stainless steel.
b. Deep fat fryer with adjustable legs.
c. Griddle with adjustable legs for mounting.
d. Convection Stem Cooker with in-line water conditioner and legs for mounting.

1.7 UTILITY DISTRIBUTION AND CANOPY VENTILATING SYSTEMS

A. Modify accepted manufacturers' standard items or construction as necessary to conform to M-DCPS Master Specification Guidelines.

B. Provide a utility distribution system (stainless steel horizontal raceways with vertical risers) under a canopy ventilator island for electric, gas, cold water, and hot water to kitchen equipment locations.

C. Gas Requirements:
   1. Design of quick disconnects furnished for gas hose connections from appliances shall not allow connection of hoses of other utilities, even if of the same size.
   2. Provide gas equipment with factory installed internal piping loop with a single service connection.
   3. Provide gas shut-off controls.
   4. Emergency gas shut-off by hood activation and not fire alarm.

D. Electrical Requirements:
   1. Label raceways, ventilator, breakers, receptacle plates, and components as specified in M-DCPS Master Specification Guidelines.
   2. Label remote breakers with equipment identification, amperage, voltage and phasing.
   3. Provide receptacle plates concealed or below raceways with a duplicate identification label located in plain view and designating location of plate.
   4. Provide each receptacle plate in kitchen area with a hinged, waterproof cover over each receptacle.
   5. Electrical components used in raceways, chases and controls shall be readily obtainable locally.
   6. Provide main electrical service disconnect in service riser.
   7. Connection or installation of electrical components shall not require soldering.

E. Plumbing Requirements:
   1. Isolate plumbing compartments from electrical compartments.
   2. Color code and label piping and disconnects in system.
   3. See Division 15 for additional requirements.

F. Provide letter or word identification and color coding for utilities as follows:
   1. Gas: Yellow
   2. Hot Water: Red
   3. Cold Water: Blue

G. Exhaust hood (ventilation canopy) shall be listed by a Nationally Recognized Testing Laboratory (NRTL) recognized by OSHA, to comply with NFPA 96, and include the following:
   1. Stainless steel construction.
   2. Grease extracting baffle plate assembly the full length of each canopy.
   3. Fluorescent lights.
   4. Wash-down system at new construction or at existing conditions able to support a wash-down system or a dry baffle system for a direct replacement.

5. UL Standard 300 listed wet chemical automatic fire suppression (extinguishing) system (AFSS) for the protection of grease removal devices, hoods, duct systems and under hood cooking equipment.
    a. Extinguishing agent cylinder shall be stored pressure type with a pressure indicating gauge device. Cartridge type systems with an unpressurized extinguishing agent cylinder are not allowed.
    b. The portion of the extinguishing system for the protection of grease removal devices and hoods may be omitted if all cooking equipment is served by a listed exhaust hood containing a constant or fire-actuated listed water-wash down system to extinguish a fire in grease removal devices and hoods. The water-wash down system shall not adversely affect the operation of the extinguishing equipment for the duct and cooking equipment.
    c. The portion of the extinguishing system for the protection of the duct system may be omitted if all the cooking equipment is served by a listed exhaust hood with or without damper and a constant or fire-actuated listed water-wash down system to extinguish a fire in the duct system.
6. Filterless ventilation system.
7. Supply air plenum with maximum discharge velocity of 150 fpm.
8. The kitchen hood shall be designed so that the fresh air in-take does not blow directly onto users when they are standing in front of the hood.
9. See Division 15 for additional requirements.

1.8 FOOD SERVICE SHELVING

A. Provide shelving for the food service areas in accordance with the Educational Specifications and Staff from M-DCPS Food and Nutrition.

B. Shelving shall be freestanding, unless otherwise indicated as “mobile”.

C. Install first shelf 10 inches above finish floor with remaining shelves equally spaced.

D. Dry Storage Shelving:
1. Provide mobile shelving units along the full length of three (3) perimeter walls. Shelving shall be high-density wire-type or smooth polypropylene with steel core posts and traverses. Individual mobile units to 3 to 5 feet in length, 24" wide, 75" high, 4 tiered with each tier spaced approximately 18"apart. Each unit shall be provided with high-density stem type casters with at least 2 casters having brakes. Minimum each shelf weight-bearing capacity shall be 400 pounds at corners and 600 to 800 pounds on straight shelving. Coordinate layout with M-DCPS Food Service Specialist
2. Provide high-density wire-type top-track storage shelving systems along the full length of one perimeter wall. Minimum of 3 mobile units positioned between stationary end units. Spacing of mobile units to create a single aisle opening between any two units as needed.
3. Provide four (4) 24" wide and 80" high Gravity Fed Can Dispensing Racks made of high strength all-welded aluminum construction. Each unit shall have mobile locking casters and hold approximately 162 #10 cans. Gravity fed can unit to be placed in center of dry storage room.
4. Provide one (1) 24" wide and 40" high Gravity Fed Can Dispensing Rack made of high strength all-welded aluminum construction. Unit shall have mobile locking casters and

hold approximately 72 #10 cans. Gravity fed can unit to be placed in center of dry storage room.

E. Paper Storage Shelving:
   1. Provide Cantilevered Shelving heavy-duty aluminum construction with cross brace support. Free standing units to be 5 feet in length, 24" wide and 72" high with outer leg support. Each unit to have three (3) 24" deep tubular adjustable shelves paced approximately 24" apart. Shelf capacity minimum of 900 lbs. Supply minimum of six (6) units placed on perimeter walls.
   2. Provide mobile shelving units along the full length of three (3) perimeter walls. Shelving shall be high-density wire-type or smooth polypropylene with steel core posts and traverses. Individual mobile units to 3 to 5 feet in length, 24" wide, 75" high, 4 tiered with each tier spaced approximately 18" apart. Coordinate layout with M-DCPS Food Service Specialist.

F. Cold Storage and Freezer Shelving:
   1. Provide reinforced polymer-shelving units that are mobile, corrosion and rust proof, and designed for use in temperatures from –10º F to 45º F. Individual units shall be a minimum 36" to 60" long, 24" wide and 75" high, with 4 open grid adjustable shelves. Mobile shelving units shall have a minimum of 600 lb capacity per shelf. Shelving to be placed continuous along three perimeter walls of the walk-in cooler and freezer.
   2. Provide durable, heavy-duty one-piece polymer construction dunnage racks, designed for use in temperatures from –10º F to 45º F, with slotted top to provide for proper air circulation. Each rack shall be 36" to 60" wide, 12" high, and 21"deep. Dunnage racks shall be placed along entire length of remaining wall directly under the cooler and freezer fans.

1.9 GYMNASIUM EQUIPMENT

A. Basketball Backboards:
   1. Provide ceiling supported basketball backboards.
   2. Coordinate with ceiling construction, lighting layout, duct layout and adjacent wall construction to provide an electrically operated forward folding and rear braced backboards.

B. Scoreboards:
   1. Provide a wireless scoreboard system with two scoreboards and one controller.
   2. Locate scoreboards at opposite ends of the main basketball court, and with clear and unimpeded view of the entire scoreboard from the bleacher areas and the gymnasium floor.
   3. Basketball scoreboards shall have bar/LED numbers and wrestling captions.
   4. Scoreboards shall be properly grounded.

1.10 KILNS

A. Kiln rooms are required at new construction projects when serving students from kindergarten through grade 12:
   1. See program requirements for kiln area renovations serving grades 4 through 12.
   2. See program requirements for kiln quantities.

B. Kiln rooms and kiln areas shall comply with the following:
   1. Locate away from exits and paths of egress.
   2. Fire rated wall partitions for new, renovated, or remodeled projects are not required.
   3. Specify a sealed concrete floor with a trowel and light broom finish.
   4. Provide square footage according to program requirements.
   5. Kiln rooms will be used only for kiln operations and contain only kiln equipment. Provide "COMBUSTIBLE STORAGE NOT PERMITTED" signage.

C. Ventilation:
   1. At kiln rooms, provide a wall or door makeup air louver 12 inches above finish floor and an exhaust fan with a grille at the opposite end of the room.
   2. At kiln areas, provide an M-DCPS accepted exhaust hood to fit over the M-DCPS accepted kiln.
   3. Provide manually operated, thermostatically controlled exhaust systems, rated at 250 CFM minimum, and vented to the exterior. Outside makeup air is not required, unless the kiln room has only exterior access.
   4. Exhaust ducts shall be under negative pressure.

D. Shielding and Clearances:
   1. Provide 18 inch minimum clearance between kilns and walls.
   2. Provide adequate clearances at the front of kilns for proper loading and unloading. Kiln rooms shall be accessible to the disable.
   3. Provide kiln areas with 48 inch high minimum side/rear walls.

E. Electrical:
   1. Verify available voltage of 208 or 220/240 at new and existing kiln rooms before kiln selection.
   2. Drawings shall coordinate the locations of the appropriate power outlet, the exhaust hood when required, and the In-Contact kiln.
      a. Kilns with on/off switches shall receive an appropriate, visible, and easily accessed outlet to be within reach of the 6 feet long power cord of the kiln and have the panel circuit breaker identified "KILN".
      b. Provide an accessible disconnect switch within the room for hard-wired kilns.
   3. Install rate of rise heat detectors at kiln rooms.

1.11 DUST COLLECTION SYSTEMS

A. Locate dust collection equipment in mechanical rooms or provide security fencing if at an exterior location.

1.12 LABORATORY EQUIPMENT

A. Equipment and casework lists are contained in M-DCPS Master Specification Guidelines. Select equipment and casework according to program requirements.

B. Laboratory casework, accepted by M-DCPS, shall be provided by one common laboratory furniture company.

C. Accessible components shall have a forward approach for accessibility to the disabled. A parallel wheelchair approach for side access is not acceptable. See FBC for clearances and allowable heights.

D. Equipment not listed in the M-DCPS Master Specification Guidelines requires prior M-DCPS acceptance.

E. A combined vandal resistant cold water/gas faucet shall be used in science laboratory student sinks and work stations.

F. Provide tamperproof fasteners and fittings on equipment.

G. Use vacuum breaker fittings on gas, water or water related items.

H. Laboratory sinks and cup drains shall be black, epoxy resin.

I. Laboratory casework includes, but is not limited to:
   1. Tables and Worktops:
      a. Tops designed to contain spills.
      b. At science classrooms specify plastic laminates tops.
      c. At science demo classrooms and science labs specify solid epoxy resin tops and sinks.
   2. Cabinets:
      a. Specify a clear oak or other clear wood exterior and concealed plywood construction.
      b. Flakeboard, particleboard and other types of wood composition board are not allowed.
      c. Display cabinets shall have sliding wood framed doors with safety glass. Swinging glass doors are not allowed.
      d. Specify locks at doors and drawers according to program requirements. All cabinet locks (drawers and doors) within a new facility shall be keyed to one grand master. All cabinet locks within a room shall be keyed alike, but shall be keyed differently from any other room.

J. Laboratory equipment includes, but not limited to, the following:
   1. Student Stations:
      a. Specify with steel support structure and solid epoxy resin tops and sinks.
      b. Provide for at least one student work station accessible to the disabled in each laboratory and demonstration classroom.
   2. Fume Hoods:
      a. Provide a forward approach for accessibility, supplemental air hood, epoxy resin work surface, natural gas, cold water, epoxy resin cup sink, acid waste, electricity, and vapor-proof light.
      b. Fume hoods shall comply with SAMA, ASHRAE, NFPA, and other applicable codes.
      c. Fume hoods shall be located within the laboratory to allow unimpeded exit in case of a fire or explosion within the fume hood. Locate hoods away from paths of egress.

d. Provide unifacial and bifacial fume hoods according to program requirements. Fume hoods shall be located to ensure that proper ADA access is provided to each unit. .
e. Locate fume hoods away from high traffic areas and provide sufficient aisle space for access.
f. Safety devices such as drench shower/eye wash stations and fire extinguishers shall be near the fume hood. Locate a floor drain at each drench shower/eye wash station.
g. Fume hood exhaust system shall be coordinated with the room emergency exhaust system and the supplemental outside air supply, and not interconnected with other ventilation duct systems.
    1) Locate emergency exhaust fan switch within 15 feet of the instructor's desk and on the primary egress path.
    2) When the emergency exhaust fan is turned on:
        a) Fume hood exhaust fans shall remain in operation.
        b) Fume hood supply fans shall automatically shut down according to FBC.
    3) Locate hoods to avoid cross currents and air turbulence at fume hood face due to ventilating inlets or high traffic.
    4) At instructor designated fume hoods and at chemistry labs, provide for normal laboratory usage with an average face velocity of 100 fpm and a minimum at any one point of 80 fpm.
    5) At science demonstration classrooms and at physics and biology labs, provide for low toxicity usage with an average face velocity of 75-80 fpm and a minimum at any one point of 50-60 fpm.
h. Fume hood design shall allow for safe and efficient operation during normal laboratory conditions within acceptable specified tolerances when connected to an exhaust system.
i. Dead air pockets and reverse air currents are not allowed along surface of hood interiors.
j. Exhaust and supply system shall be roof mounted with vertical discharge stack on exhaust blower.
k. Required airflow shall be achieved when adjustable baffles are at full-open position.

3. Safety Components:
    a. Provide safety cabinets with an emergency shower, eyewash fountain, and storage space for first aid kit, fire blankets, fire extinguisher and sand bucket. All safety cabinets shall be accessible to the disabled, easily reached from all areas of the lab and out of egress paths.
        1) An emergency shower shall have a pull valve and pull cord to be held under the shower to wash away chemical contamination. Locate a floor drain at the emergency shower.
        2) Eye wash fittings shall have push type flag valves and soft stream heads.
    b. Provide a 6-foot long rubber drench hoses and hose spray fittings for deck mounting at the instructor's demo desk, according to the project specific Educational Specifications requirements.

END OF DIVISION