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HVAC

Pathway Specific Equipment Specifications

The purpose of this document is to provide school districts a standard purchasing procedures document to use when installing or upgrading computer labs. This document provides minimum specifications for equipment, software, furniture, and so forth. The district will be responsible for purchasing and maintaining all equipment, providing proper security, replacing missing equipment, and providing annual funds for the operation of the program. The district is also responsible for providing site preparation and electrical wiring. Schools that wish to purchase items different from those in this specification document will require written permission from the MDE.

Due to budget constraints, districts are encouraged to use existing hardware, software, and furniture and supplement with new items as needed. For existing items, the MDE will waive the requirement to purchase new items if the existing product meets the minimum specifications listed here. Some items in these specifications are listed as “optional,” and it is at the school district’s discretion whether these items should be purchased.

Important Notes Concerning this Document

- **When configuring labs, please refer to both the General Equipment Specifications and Pathway Specific Equipment documents located on the Curriculum Download page. The General Equipment Specifications document contains a list of equipment needed to successfully implement all programs. The Pathway Specific document contains a list of equipment needed for a specific pathway. You will need to order the necessary equipment from both lists in order to implement your program.**
- If labs are shared for multiple programs, be sure the minimum specifications are met for all programs.
- Any requests for Apple computers and/or hardware will be handled on a case-by-case basis by the Mississippi Department of Education. Apple should certify that all curricula, hardware, and software will run with items listed elsewhere in this document
- An existing server may be used with approval from local information technology (IT) personnel and the MDE.
- Existing networking equipment may be used if minimum specifications are met.
- Districts that install a wireless lab must gain permission from the MDE. Contact Christy Todd at ctodd@mde.k12.ms.us.
- Districts may choose to purchase switches with fewer than 48 ports, matching the number of ports to the size requirements of the labs. If using a wireless network, wired switch(es) would be shared among labs according to the district's needs.
- Alternate office productivity, keyboarding, creative suite, and/or CAD software may be used upon approval of the MDE. It is recommended that each district investigate existing software licenses to see if these programs may be added.
- This equipment specification document contains preferred items as well as an alternate “thin client” option. If the thin client option is chosen, it is imperative that ample Internet access be available as online software is readily used with this option.

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A. Computer Systems and Peripherals

Minimum specifications for lab hardware are based on the current Express Products List (EPL). The Mississippi Department of Information Technology Services (ITS) EPLs have stated dollar spending limits. For instance, for hardware EPLs, the limits are:

- **For purchases over \$50,000, the customer MUST solicit quotations from two or more EPL sellers.**
- For K-12 Schools, the dollar limitation is interpreted by ITS to be \$200,000 per project per school or campus per fiscal year, with a maximum dollar limitation of \$1,000,000 per school district per fiscal year for a project that spans multiple schools within the district.
- Projects costing in excess of \$200,000 are beyond the scope of this delegated process and subject to full ITS review and authorization. Authorization to exceed the EPL dollar limitation is described in the ITS Procurement Handbook under the ***EPL Planned Purchase*** process, article 013-080. <http://dsitspe01.its.ms.gov/its/procman.nsf/TOC4?OpenView>

Schools that choose to use the ITS EPLs will need to follow the ITS EPL instructions. Schools that choose to advertise for bids are encouraged to use the EPLs to compare prices and quality of equipment submitted on bids.

Inside delivery, installation, and setup must take place by the specified target date. School districts may choose to install the equipment and software themselves or have the EPL vendors perform the installation. If a school prefers that the hardware installation be done by the EPL vendor, the EPL quote must include installation, setup, and training (to be scheduled by each local school district). If a school prefers that the software installation be done by the EPL vendor, the EPL quote must also include pre-loading the software described in Section B “Software,” with the school providing the vendor media and proof of license. Vendors should assume that they will perform hardware and software installation unless otherwise indicated by the school in the quote request.

Vendors must propose systems which are configured with all components provided by the base system manufacturer. If a component is not available from the base system manufacturer, the vendor may propose a compatible third party component only if described in their written proposal. Systems and peripherals must be fully configured prior to shipment.

If a warranted defect is found in an item, that item must be repaired or replaced on-site within five working days of notification. A toll-free or local telephone number with a 24-hour response time must be provided for troubleshooting purposes. In the event that a component must be returned to the manufacturer for warranted repairs, a replacement will be provided by the vendor. Charges for shipping and handling of the component and its replacement must be borne by the vendor during the on-site warranty period. All warranty repairs made to the system during the warranty period must maintain full compatibility of the system with installed software. Any components found to be defective must be replaced with the same brand and model or its successor.

If the school district chooses not to use the ITS EPLs, the Vendor Certification for IT Equipment and software Statement must be signed by the bidder and returned with the bid.

Districts may exercise the option of having all items bid and installed in the specified configuration by a single vendor or multiple vendors. All upgrades are to be installed and operational by the Target Date.

NOTE: If labs are shared for multiple programs, be sure the minimum specifications are met for all programs. Schools may choose wired or wireless labs. They may also choose to use standard computers or the thin-client option.

Capitalized Items

Spec Item Number	Description	Suggested Quantity
1	<p>Air compressor (Ingersoll Rand Electric Stationary Air Compressor) (Fully Packaged) (Model # 7100E 15-V or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • •Package: Fully packaged • •CFM: 50 • •Volts: 230 VAC (or determined by school shop voltage) • •15 HP Electric Motor • •3 Phase Motor • •Two stage reciprocating pump • •Splash lubricated housing • •Belt driven • •Air Tank Size (gallon): 120 • •Outlet Size: 1-in. • •Drain: Automatic Tank Drain • •Stationary Permanent Mount 	1
2	<p>Refrigeration System Demonstrator - HVAC Trainer (Lab-Volt 3,400 or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • Integrated training system that demonstrates components and operating systems of refrigeration and heat pump systems • System unit includes hermitically sealed 1/4-hp compressor, R-134a refrigerant, indoor evaporator and outdoor condenser coils with copper and clear tubing, variable speed fan, and adjustable damper. • Control devices: High-pressure switch, low-pressure switch, hermostatic expansion valve, capillary tube, heat pump type expansion device, and four manual reversing valves • Instrumentation: Temperature meter, compound gauges, pressure gauges, and indicator lamps • Safety pressure switch and main electrical breaker • Six fault insertion toggle switches • Also includes refrigerant charging equipment and tool cabinet • Includes correlated courseware including a student manual, user setup manual, and teacher's guide • Includes delivery, installation, setup, and on-site instructor training 	1

Spec Item Number	Description	Suggested Quantity
3	<p>Recovery/recycling equipment (1) (Cooltech R-134a or equal)</p> <p><i>Minimum Specifications:</i></p> <ul style="list-style-type: none"> • Voltage: 115V 60 Hz • Refrigerant Container On-board: 30 lb. (14 kg) vessel (source tank not included) • Operating Range: 50° to 120°F (11° to 49°C) • Recycling Filter-Drier: 43 cu. in. spin-on type • Pump Free Air Displacement: 3 cfm (142 L/min) • Dimensions: 44" H x 34" W x 23" D (127 cm x 86.4 cm x 58.4 cm) • Shipping Weight: 235 lbs. (106.6 kg) 	1
4	<p>Commercial/Industrial ice machine (Ice-O-Matic ICE0400FA or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • Compressor Type –Air Cooled • Depth (in) –31 • Height (in) –70 • Ice Type –Cube • Ice Style –Full Cube • Bin Capacity –510 • Access Type –Lift Up Door • Voltage –115/60/1 • Width (in) –30.13 • Production –505 • Specialty Options –Antimicrobial System • Weight –290.00 	1
5	<p>A/C split (gas) (Goodman GSX160181 or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • Uses most current Freon on market • Minimum 13 SEER • Minimum 80% AFUE furnace • Minimum 1.5 ton • All lines and accessories • Furnace fuel can be choice of district 	1
6	<p>Residential package heating (Dual purpose—for heating and cooling instruction) (Goodman GPG1324045M41 or equal.)</p> <p><i>Minimum Specifications</i></p>	1

Spec Item Number	Description	Suggested Quantity
	<ul style="list-style-type: none"> • 2 Ton Cooling • 46,000 BTU Heating • R-410A Refrigerant • 13 SEER 	
7	<p>Air-to-air heat pump (with electrical backup heat) (Kilmaire 23 or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • 12,000 Btu • Ductless Mini Split • DC Inverter Air Conditioner & Heat Pump • 110 V • 	1
8	<p>Combination Shear, Brake, & Roll (JET 756041 or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • Right or left hand operation • Shearing capacity (mild steel): 20-gauge x 40in. • Bending capacity (mild steel): 20-gauge x 40in. • Rolling capacity (mild steel): 20-gauge x 40in. • Size of slip roll: 40in.L x 1 5/8in.W • Male upper die widths: 1in., 1 1/2in., 2in., 2 1/2in., 4in., 7in., 10in. and 15in. • Upper die heights: 3 3/8in. • Minimum forming radius is 1in. • Three 1 5/8in. dia. rolls • Includes one 90° female die • Spring-loaded work hold down • Back gauge • Requires 36in. working height 	1

Spec Item Number	Description	Suggested Quantity
9	<p>Two Door Refrigerator (True Food Service Equipment T-49 or equal)</p> <p><i>Minimum Specifications</i></p> <ul style="list-style-type: none"> • Amps: 9.5\ • Cubic Feet: 49 • Depth: 29-1/2" • Doors: 2; Height: 78-1/4"; HP: 1/2 • Length: 54" • Model #: T-49 • Shelves: 6 	
10	<p>One-Door Refrigerator (True Food Service Equipment T19)</p> <p>Minimum Specification</p> <ul style="list-style-type: none"> • Amps: 8.9 • Cubic Feet: 19 • Depth: 24-1/2" • Doors: 1 • Height: 75-1/4" • HP: 1/3 • Length: 27" • Shelves: 3 	

NON-CAPITALIZED ITEMS

Tools

1. Acetylene B-tank (8)
2. Acetylene regulator-hose and tips (turbo)—tip with halide leak detector (4)
3. Bench/metal top with metal vise (10)
4. C clamps, assorted sets—6 in., 8 in., 10 in. (3)
5. Divider set (1)
6. Drill, 3/8-in. and 1/2-in. electric (1)
7. 7-in. pedestal grinder, commercial (1)
8. 220-V kit quick start (1)
9. 110-V kit quick start (1)
10. Electronic leak detector (2)
11. Pop rivet gun set (1)
12. Service valve kit (2)
13. Snips: straight, left, right (3)
14. Soldering station (1)
15. Combination squares (2)
16. Tap and die set (1 metric and 1 SAE)
17. 25-ft tape measure (2)
18. 3-ft metal rules (2)
19. Universal appliance truck (1)
20. Vacuum (wet or dry)(1)
21. Oxyfuel welding units (2)
22. Pipe wrench set
23. Chisel set (2)
24. Combination wrench sets (1 metric and 1 SAE)
25. Diagonal cutters (4)
26. Reciprocating saw (1)
27. Grinder, side (4 in. and 7 in.) (1)
28. File set (1)
29. Flare/swage sets (5)
30. Nitrogen tank and recycling regulator and relief valve (1)
31. First aid kit (1)
32. Schrader valve core removal tool (1)
33. Low loss fittings (3)
34. Industrial flashlight (1)
35. Fuse puller (1)
36. Hack saws (2)
37. Ball-peen hammer sets (2)
38. Set, refrigeration flare nut wrench (7/16 in.–1 in.) (1)
39. Nut driver sets (4)
40. Pinch off tool (1)
41. Pliers (slip joint/needle nose/linesman locking) (4)
42. Scratch awls (2)
43. Screwdriver sets (straight and Phillips) (4)
44. Sockets and ratchet set—2-in. and 3/8-in. drive, 1/4-in. drive (1 metric and 1 SAE)
45. Tubing bender set (1)
46. Tubing cutter kits (5)
47. Wire strippers (5)
48. Allen wrenches sets (2)
49. Wire end crimpers (2)
50. Sanitation cabinet with 1 pair of safety glasses per person (1)
51. 8 ft. fiberglass ladder (1)
52. Cordless drills, 3/8 in. and 2 in. (1 each)
53. Four wheel cart (1)
54. Appliance lift (1)
55. Torpedo levels – 9 in. (2)
56. Spirit level, 36 in. (1)
57. Claw hammers (2)
58. Stainless steel brush (2)
59. Stainless steel wire brush (toothbrush) (2)
60. Adjustable wrenches, 6 in. – 8 in. – 10 in. (2 each)
61. Open end—box end wrench sets—1/4 in. through 1 in. (2)
62. Pipe vise with tripod (1)
63. Pipe die set, 3/8 in. through 1 1/4 in. (1)
64. Pipe reamer (1)
65. High speed drill bit set with 2-in. shank 1/16 in. through 2 in. (1)
66. Analog multi-meters (6)
67. Digital multi-meter (6)
68. PCV cutters—3/8 in. through 1 in. (3)
69. Pump sprayer (2)
70. Air Compressor Accessory Kit (1)
71. Refrigeration Service Gauge Set (2)
72. Infrared Thermal Meter (3)
73. Circular snips (3)
74. Combination snips (3)
75. Hollow punch (2)
76. Aviation ships (4)
77. Power shears (1)
78. Sheet metal gauge (2)
79. Hand seamer (1)
80. Hand Groover (1)
81. Sheet metal rivet gun (2)

Equipment

1. A/C window unit (1)
2. Residential refrigerator (1)
3. Clamp-on ammeters (4)
4. Hermetic analyzer (1)
5. Capacitor analyzer (1)
6. Set of recording ammeter and voltmeter (1)
7. Electronic thermometer (1)
8. Electronic charging scale (1)
9. Micron vacuum gauge (1)
10. Manifold gauge sets (6)
11. Bimetal (digital) thermometers (6)
12. Temperature recorder (1)
13. Psychrometer (dry and wet bulb) (2)
14. Vacuum pumps (2)
15. Refrigerant identifier (1)
16. Storage tanks (3)
17. Hand oil pump (1)
18. Combustion test kit (1)
19. U-tube manometer (1)
20. Carbon monoxide tester (1)
21. Velocity meter (Dual purpose—for heating and cooling instruction) (1)
22. First Aid Kit (OSHA approved) (MSC Item #45908712 or equal)