

Facility Design and Equipment Purchasing for School Nutrition Programs



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Introduction

This manual is tailored to school nutrition professionals involved in facility renovation and design and purchasing equipment for their nutrition program. Other school nutrition staff and planning team members may also find the information useful. School nutrition professionals will receive the best value from this manual when it is read in its entirety. However, school nutrition professionals may reference stand-alone chapters as needed.

The purpose of the manual is to be a resource for school nutrition professionals of any level of experience so that they understand the basics of facility design and equipment purchasing and have the research and guides to support their projects. This resource will help team members make informed facility design and procurement decisions. Through more informed procurement decisions, team members will bring more value to their nutrition programs, such as increased participation, more effective use of labor, space, and equipment, and energy and resource conservation.

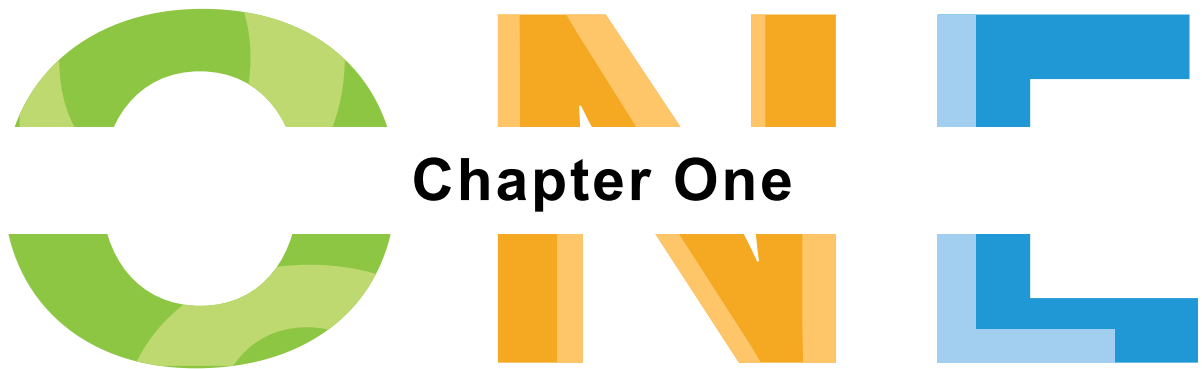
This manual replaces the previous edition released in 2009. While the core concepts and templates remain, this version has significant revisions and additions, including guidance throughout for schools that want to incorporate more speed scratch and scratch cooking (National Food Service Management Institute, 2009).

This manual is divided into three sections and includes appendices. Section One introduces facility design and equipment procurement. Chapters include how to organize and work with a planning team, trends associated with school nutrition program equipment, planning the new construction or renovation project, and facility design.

Section Two provides guidance on making equipment choices, with two chapters devoted to detailed fact sheets on commercial large and small equipment. These fact sheets include specification key points, intended use, things to consider before purchasing, and special features available.

Section Three includes how to bid as part of the procurement process, emphasizing the regulations and ethics involved. The last chapter in this section discusses receiving and installing the equipment, staff training, and assessing staff competence.

The appendices contain templates for the school nutrition professional to use as is or modify as needed. Appendix A is the School Nutrition Program Profile, which is used to collect important information regarding the needs and preferences of the school nutrition program. Appendices B and C contain checklists for renovations, additions, and new construction projects. Appendix D offers a template assessment to record staff competency in using equipment. Appendix E provides a template for the school nutrition professional to evaluate whether all specifications for equipment are included in the bid or proposal. Appendices F, G, and H are templates for proposals and bids.



Organizing and Working with the Planning Team

CHAPTER ONE OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- Who to include in the planning team
- Roles and responsibilities of the planning team, including all independent consultants
- Roles and responsibilities of guidance and approval agencies

The first phase in the facility design and equipment procurement cycle is project initiation. During this phase of starting a new project, the scope of the project is determined, planning team members are identified, the expected outcome is defined, and an overview of the project is communicated to the entire planning team. The size and members of the planning team will depend on the extent of work to be done and who is involved with the project's outcomes. The planning team should be created well in advance of the project kick-off. Larger projects require a longer lead time. For example, the planning team may only need six months to a year to plan to purchase and receive a new piece of equipment. However, a renovation may take one to two years to plan; while a new construction project may take two to three years to plan due to the scope of the project. These time frames are estimates as each school district may have a different timeline.

The first step is to determine the scope of your project. The planning team's size will depend upon the type of project. For example, buying a new oven requires a different makeup and size for a planning team than constructing a new kitchen and dining area. If purchasing a single piece of equipment, the planning team can be made up of two to three members, such as the school nutrition professional, a representative of the maintenance division, and possibly a member of the school district's construction division. For a major renovation or construction project, a larger planning team will be needed, including people with a wide variety of expertise. School nutrition professionals may find these experts internally, as some districts have design and construction teams that lead renovation and construction work. If the school district does not have internal design and construction teams, a consultant or other contractor may be utilized.

The next step is to identify the team members needed for the type of project by considering the necessary skills, experience, and expertise. The planning team may include internal school nutrition staff and external experts such as a program operator from another district who has purchased similar equipment, a building contractor, and independent consultants. The composition of the planning team will vary by district. Not all planning team members may be involved in all project phases. Tables 1–4 list standard planning team members with their typical daily responsibilities and how they might contribute to the project. Note that some team members give their input at specific times during the project. For example, an electrical, mechanical, or structural engineer’s services may be requested for specific needs, but they may not be involved during the entire project.

Table 1 details the potential responsibilities of school nutrition staff during the project and includes the most common titles, typical responsibilities, and project responsibilities for each staff member. These titles and responsibilities may differ in individual school districts. The ideal situation is that the school nutrition professional is a leader in all project phases to ensure the facility design and equipment purchases support the nutrition program as needed. However, the school nutrition professional might have a different role depending on how the project is structured and managed. Minimally, the school nutrition professional should be involved in shaping the project and should receive regular updates throughout the project.

Table 1**School Nutrition Staff Titles and Responsibilities^a**

Titles	Typical Responsibilities	Project Responsibilities
School Nutrition Director	<ul style="list-style-type: none"> • Supervises all aspects of foodservice in all schools or sites within the district • Administers the nutrition program according to local, State, and Federal policy 	<ul style="list-style-type: none"> • Assists in all phases of the project to ensure the new facility, renovation, and equipment supports and accommodates the nutrition program as required • Manages the development of the Program Profile^b to guide the objectives and approval of the facility design and equipment purchases • Maintains a copy of all blueprints, specifications, and changes
School Nutrition Supervisor	<ul style="list-style-type: none"> • Provides support to the director and is typically employed in larger districts • May have responsibilities in areas such as procurement, financial management, menu planning, nutrition education, training, and compliance 	<ul style="list-style-type: none"> • Involvement in the project might be focused on giving initial input on what is working well and improvements that need to be made to complete the Program Profile^b • Summarizes project updates for the school nutrition director
School Nutrition Manager or Assistant Manager	<ul style="list-style-type: none"> • Responsible for the daily operations at an individual school or site • Ensures that safety, sanitation, meal accountability, and quality standards are met • Other duties include supervision of employees, ordering of food and supplies, reconciliation of sales, meal crediting, and inventory control 	<ul style="list-style-type: none"> • Involvement in the project might be focused on giving initial input on what is working well and improvements that need to be made to complete the Program Profile^b • May be involved in testing or piloting new equipment

^a [School Nutrition Professionals. \(n.d.\). School Nutrition Association.](#)

^b A Program Profile guides the project's planning, design, and budget and ensures the finished product meets the needs of the school nutrition program. Chapter 3 covers the Program Profile, and a template is in Appendix A.

Titles	Typical Responsibilities	Project Responsibilities
School Nutrition Staff	<ul style="list-style-type: none"> • Responsible for safely preparing and serving menu items, cleaning, and sanitizing • May maintain some equipment 	<ul style="list-style-type: none"> • Since they are using the equipment and in the facility every day, involvement in the project might be focused on giving initial input on what is working well and improvements that need to be made to complete the Program Profile^b
Other School Nutrition Staff	<ul style="list-style-type: none"> • Might include bookkeepers, administrative assistants, drivers, production/warehouse staff, or other staff whose responsibilities impact the meal program 	<ul style="list-style-type: none"> • Involvement in the project might be limited to giving initial input and submitting needed reports and data to complete the Program Profile^b

^a [School Nutrition Professionals. \(n.d.\). School Nutrition Association.](#)

^b A Program Profile guides the project’s planning, design, and budget and ensures the finished product meets the needs of the school nutrition program. Chapter 3 covers the Program Profile, and a template is in Appendix A.

School administration employees are on the planning team as they bring experience and expertise in areas to complement the school nutrition professional, such as finance, capital project management, and large-scale procurement (see Table 2).

Table 2
School Staff Titles and Responsibilities

Titles	Typical Responsibilities	Project Responsibilities
Superintendent	<ul style="list-style-type: none"> • Responsible for all daily operations of the district, including instructional, business, supervision of principals and district staff, facilities, and working with the school board • Manages fiscal operations, staff hiring, lobbying for additional resources • Tracks student population and facility needs and compliance • Manages capital improvements 	<ul style="list-style-type: none"> • Develops overarching objectives of the project • Defines basic operational concepts and policies for the school nutrition program • Approves preliminary and final facility design and equipment purchases • Assists in selecting an architect

Titles	Typical Responsibilities	Project Responsibilities
Assistant Superintendent of Business Services	<ul style="list-style-type: none"> • Manages and directs the district’s business services • Serves as a resource to district and site administrators regarding the evaluation and efficiency of business operating systems and services • Reviews financial statements, supervises accounts, and performs other financial functions to ensure budget and accounting align with capital project plans • Assists in developing the budget and long-range financial and facility planning 	<ul style="list-style-type: none"> • Defines the responsibilities of each of the key players within the school district’s business division • Develops an appropriate working relationship within and among the various business support divisions • Oversees the effective use of time and resources of the school nutrition program, construction services, maintenance services, and any other related business service
Principal	<ul style="list-style-type: none"> • Responsible for ensuring their school is operating in compliance with policies and educational standards • Manages the hiring and training of teachers and staff • Works with the school board and parents to communicate important information 	<ul style="list-style-type: none"> • Assists with developing the objectives of the project • Works with the contractor and architect team during design development • Responsible for managing logistics of the educational process and student and staff safety during construction • Stays in communication with the contractor and team and passes essential information on to applicable parties

Titles	Typical Responsibilities	Project Responsibilities
Purchasing Director	<ul style="list-style-type: none"> • Monitors budget allocations and expenditures so that sound fiscal practices are followed • Authorizes purchase orders, contracts, and bids to ensure vendor compliance with regulatory requirements • Evaluates vendors and bids and engages in negotiation • Maintains records on vendors, contracts, and purchases for reporting purposes • Researches new products, laws, and regulations to provide best practices in purchasing and contracting 	<ul style="list-style-type: none"> • Manages facility and equipment procurement processes • Works closely with the school nutrition director or their designee, building contractor, and independent consultants • Maintains records on all project bids • Ensures proper handling of all requisitions • Provides historical data and current estimates for all purchases
Maintenance, Facilities, Custodial, or Construction Services Director or Project Manager	<ul style="list-style-type: none"> • Maintains school buildings and grounds so facilities are used productively and meet laws, policies, and standards. • Provides records and reports as required by compliance agencies • Performs general maintenance and repairs for equipment and facilities, including plumbing, electrical, heating, cooling, and basic carpentry • Assists in the preparation of capital fund projects and new and long-range facility planning projects • Supervises contracted maintenance and repair 	<ul style="list-style-type: none"> • Understands what maintenance and custodial procedures are necessary • Has a historical perspective of facility usage and improvements needed • Focuses on efficient operations and energy conservation • Has extensive experience with State and Federal laws and reporting regarding facility maintenance • Will have the responsibility of developing and implementing new cleaning and maintenance procedures for the new or renovated facility • Will have the responsibility of maintaining new equipment, which should be on a preventative maintenance schedule

Titles	Typical Responsibilities	Project Responsibilities
School Board Member(s)	<ul style="list-style-type: none"> • Comprised typically of elected community members to oversee the education of the students in the community as the Local Education Agency (LEA) • Evaluates the superintendent, sets policy, and communicates to the public 	<ul style="list-style-type: none"> • Helps define project objectives • Reviews and approves all design and planning decisions • Collaborates with others in selecting the contractor, architect, and other consultants

Smaller districts might not have all these roles, and actual duties depend on job descriptions, which vary among programs. In addition, some districts have support staff in the central office who work with the school nutrition director throughout the project.

After the internal planning team is identified, the next step is determining which consultants will be needed for the project. Table 3 lists the building contractor and consultants who may be involved with the project. For due diligence, school nutrition professionals may consult professional licensing boards for professionals such as building contractors, engineers, and architects, which vary by state or city. Building contractors and independent consultants can submit portfolios and references from clients they have worked with for evaluation by the planning team.

Most building contractors need to be bonded and insured. Bonded building contractors assure their clients that they will be financially protected from losses if the bonded contractor does not fulfill their contractual obligations to their subcontractors. A three-way agreement is entered into with the contractor, the school district, and the bonding agency. If the contractor fails to meet its obligations, a subcontractor can make a claim for payment against the bond instead of filing a claim against the school district. Building contractors must also carry insurance policies to compensate clients if a claim is filed against them. The risks associated with construction projects include personal and property damage. Therefore, workers' compensation and liability insurance should be required. Requiring bonded and insured building contractors protects the school district from liability and being held financially responsible if an accident or an unanticipated event causes personal or property damage. Independent consultants may need to be bonded and insured depending on the scope of their work.

The planning team should understand the scope of services offered as some building contractors and independent consultants provide full service with a team encompassing several divisions. In contrast, others may be independent consultants with a narrowly defined set of services. The cost of services and materials should also be outlined with the caveat that market prices for materials often fluctuate, and the contract should address what happens if there is an increase in cost. School nutrition program kitchens and dining areas often have different requirements than other commercial buildings, so any professional on the planning team should have experience planning, designing, and building for school nutrition program facilities. Table 3 outlines the typical responsibilities of each role and project items the school nutrition professional should consider.

Table 3

Construction and Design Consultant Titles and Responsibilities

Titles	Typical Responsibilities	Project Considerations
Architect	<ul style="list-style-type: none">• Plans and designs construction projects based on budget, identified needs, and regulatory requirements (e.g., laws, codes)• Collaborates with other professional contractors to implement the project design• Communicates to clients important information, including project status, delays, and changes• May help with recommending and negotiating with independent consultants• Performs site visits and analyzes reports for comparison to client expectations and budget• Focuses on the aesthetics, look, feel, and functionality of the facility while also considering structural design	<ul style="list-style-type: none">• Ask about other members of the architect team who will be on the project• Know the scope of their services (e.g., do they manage permits and contractors?)• Understand how their fees work (e.g., hourly versus percentage)• Understand how the fees or the contract changes if the project parameters change• Determine if LEED^a certification is desired
Electrical Engineer	<ul style="list-style-type: none">• Responsible for the planning and design of all electrical engineering services, including lighting, power distribution, and fire alarm systems• Calculates the number of light fixtures needed and estimates the cost of all materials (e.g., conduits, switches, circuit breakers)• Ensures the electrical systems follow the national electrical code and any other regulations	<ul style="list-style-type: none">• Understand how electrical systems meet LEED^a certification or other environmental requirements• Confirm how the electrical system accommodates future growth and capacity needs• Ask about backup power capabilities and the use of natural lighting

^a Leadership in Energy and Environmental Design

Titles	Typical Responsibilities	Project Considerations
Mechanical Engineer	<ul style="list-style-type: none"> • Responsible for designing and drawing the mechanical systems within the facility— heating and cooling systems, fire systems, refrigeration, piping, and plumbing • Coordinates the needs of specific kitchen equipment (e.g., the range ventilation hood, with the appropriate mechanical system) 	<ul style="list-style-type: none"> • Confirm how mechanical systems meet LEED^a certification or other environmental requirements • Evaluate how the mechanical systems allow for future growth • Look to see where the mechanical systems are placed to ensure clear passageways
Structural Engineer	<ul style="list-style-type: none"> • Takes the architect’s plans and analyzes and designs the structural support system for the building project so that all loads and forces are accounted for • Verifies the building site is appropriate for the project • Ensures renovation or new construction integrates with existing materials and elements 	<ul style="list-style-type: none"> • Ask how they typically work with architects and other team members • For renovations, if any current building failures are identified, ask about due diligence assessments
Interior Designer	<ul style="list-style-type: none"> • Uses photography, illustration, painting, and dimensional art to create the desired atmosphere • Provides furniture options and layouts, color schemes, furnishing material, and finish specifications • Outlines floor and seating plans in dining areas 	<ul style="list-style-type: none"> • May be an independent consultant, or services might be provided by a foodservice consultant or the architectural firm • Some provide food court modular structures and designs to integrate technology use
Foodservice Consultant ^b	<ul style="list-style-type: none"> • Has expertise in school nutrition, including applicable regulations • Collaborates with clients on facility design and equipment purchases by developing schematics, construction documents, and cost estimates • Provides inspection before and after equipment installation 	<ul style="list-style-type: none"> • Should not have affiliations or accept rebates or kickbacks from suppliers • Serves the best interests of the client • Works for a fixed fee for a defined scope of work

^a Leadership in Energy and Environmental Design

Titles	Typical Responsibilities	Project Considerations
Accessibility Consultant	<ul style="list-style-type: none"> • Has expertise in the standards and regulations related to accessibility • Audits or assesses existing facilities that are being renovated or reviews the design plans of new facilities • Provides a report of findings, suggestions, and recommendations 	<ul style="list-style-type: none"> • May be part of an architectural team or an independent consultant • Can be used in any phase of the project to help plan, assess, report, recommend, and solve problems
Acoustical Consultant	<ul style="list-style-type: none"> • Uses the science of how sound moves through space to design rooms and buildings to prevent excess noise and vibration • Performs tests that identify all noise sources and provide solutions to minimize unwanted sounds 	<ul style="list-style-type: none"> • May be part of an architectural team or an independent consultant • Should not work for or accept kickbacks from a supplier of acoustic-enhancing or noise barrier products
Building Contractor	<ul style="list-style-type: none"> • Supplies the build quote based on the architectural specification and drawing. • Manages the entire building project and process, including independent contractor oversight • Creates a detailed plan and material list based on the bid document prepared by the architectural plans • Ensures project plan meets codes and regulations • Manages subcontractors and meets with engineers and architects as needed • Ensures all aspects of the project meet safety and environmental standards 	<ul style="list-style-type: none"> • Look for evidence that the contractor has good communication skills as they serve as the liaison between all parties • Ask questions about past projects and how timelines and budget expectations were met • Ask about their safety record • Understand the extent of their services and team (e.g., interior design, media division) • Evaluate how they help with the planning for the continuity of the educational process and the safety of the students and staff during the project • Meet with all main team members for a compatibility check, as the project manager might be the main person on-site

^a Leadership in Energy and Environmental Design

Table 4 lists the typical guidance and approval agencies the planning team works with throughout the project. Without the proper reviews and approvals from these agencies, there might be a pause or cancellation of the project, fines, or increased safety risks. The planning team should know who is responsible for obtaining each review, approval, and permit and the corresponding deadlines and expected timeframe for approval and permit issuance.

Table 4

Guidance and Approval Agencies Titles and Responsibilities

Titles	Typical Responsibilities	Project Responsibilities
State Building Commission	<ul style="list-style-type: none"> • Typically has authority over property that the State has an interest including those that use public funds • Promotes quality in design and construction, responsible fiscal management, and fair competition for work • May review plans for compliance, provide consultation, administer contracts on State bond issue projects, or conduct periodic inspections 	<ul style="list-style-type: none"> • Authority and approval requirements vary by State • May be involved with State bond issue projects • May provide consultation services to school boards
State and Local Health Departments	<ul style="list-style-type: none"> • Primary role is to ensure public health and safety through the enactment and enforcement of rules and regulations • Review preliminary and final plans and equipment specifications for kitchen facilities to ensure compliance • Issue permits once construction is completed and the facility is approved 	<ul style="list-style-type: none"> • The authority of the local department might be granted via the State or be independent • Some states have processes and regulations specific to school nutrition programs • Understand the submittal process and corresponding deadlines of each department

Titles	Typical Responsibilities	Project Responsibilities
State School Architect	<ul style="list-style-type: none"> • Reviews and approves contracts, plans, and specifications so that construction complies with regulatory requirements • Provides design and construction oversight • Inspects the completed project to verify it conforms to plans and specifications 	<ul style="list-style-type: none"> • Some states offer a preliminary meeting to answer questions • Ask about fees for the project plan review and confirm what documents need to be submitted by what deadline
State Agency ^a	<ul style="list-style-type: none"> • Administers school nutrition programs • Acts as the liaison between the U.S. Department of Agriculture (USDA) Food and Nutrition Service (FNS) and local program operators • Ensures programs follow Federal requirements 	<ul style="list-style-type: none"> • Provides guidance on allowable and unallowable costs regarding renovations and new construction of school kitchens^b • Advises school nutrition programs on compliance with State and Federal mandates • Some states may require State agency review and approval of various parts of the project

^a [USDA FNS. \(2023, August\). National School Lunch Program: State agency.](#)

^b See, for example, [2 CFR 200.407](#), [2 CFR 200.452](#), [7 CFR 210.14\(a\)](#)

A kick-off meeting will allow the team to formally meet, exchange contact information, establish expectations, determine timelines and deadlines, and keep the team working in the same direction. The planning team members invited to attend a kick-off meeting will depend upon the scope and complexity of the project.

The school nutrition professional should start communicating early with potential planning team members. Each potential team member brings a specific perspective and experience to their role on the planning team. After the initial meeting of the planning team, the school nutrition professional can ask for a meeting with building contractors and independent consultants. The school nutrition professional should come to the meeting with questions for the building contractor and independent consultants, including what the consultants think they will bring to the project, when their input is needed, and how they work best on these types of projects. The school nutrition professional should listen intently to how the potential building contractor or independent consultant describes their approach and experience in similar projects.



Chapter Two



Regulations and Trends Associated with Program Equipment

CHAPTER TWO OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- How school nutrition regulations affect facility design and equipment purchases
- How trends in school nutrition may impact facility design and equipment purchases

School nutrition professionals should understand how regulations that inform meal pattern requirements and the school nutrition standards are essential considerations in facility design and equipment purchases. In addition to regulations, trends in school nutrition and foodservice can impact facility design.

Meal Pattern and Wellness Considerations

In accordance with the law, the Richard B. Russell National School Lunch Act, the USDA is required to develop meal pattern requirements and school nutrition standards consistent with the goals of the most recent edition of the *Dietary Guidelines for Americans* (USDA, 2020). Other legislation, such as the Local School Wellness Policy Implementation Under the Healthy, Hunger-Free Kids Act of 2010 (HHFKA) (2016), affects facility design and equipment purchases. This rule requires that each local educational agency develop a school nutrition setting that promotes students' health, well-being, and ability to learn. For example, local school wellness policies may include developing and implementing farm-to-school activities, such as school gardens, nutrition, culinary, and agriculture education, and using local foods in school nutrition programs. Local school wellness policies may require adequate time for students to eat meals, which could affect serving line design and the number of serving lines needed to expedite meal service. Locally grown produce that needs to be cut or sliced could affect the type of equipment required to process the fresh produce. Merchandising or marketing techniques intended to highlight healthy selections may necessitate using display units. The local school wellness policy encourages the consumption of whole grains, fruits, and vegetables. Implementing this policy may require larger preparation and cooking space, increased storage, and specific equipment to meet the program's needs.

Legislation dictates meal patterns and wellness requirements, and schools often use creative methods to engage students, such as taste tests, student recipe contests, and cooking demonstrations. Therefore, facility design and equipment purchases by the planning team should consider how to meet operational needs and legislative requirements and actively engage students (Centers for Disease Control and Prevention, 2014).

The right kitchen equipment and facility design will help school nutrition programs meet meal pattern requirements and school nutrition standards. Schools need the proper kitchen equipment and space to efficiently and safely prepare and serve nutritious meals. For example, fryers may need to be replaced with ovens, and adequate counter space is necessary to prepare fresh produce.

Research provides evidence that many schools are lacking in equipment and infrastructure. The Kids' Safe and Healthful Food Project, an initiative of The Pew Charitable Trusts and the Robert Wood Johnson Foundation (2013), collected self-reported data from school food service directors to document their needs to implement updated requirements for the National School Lunch Program (NSLP). This study did not determine whether school districts were found to be out of compliance with NSLP requirements based on their equipment and infrastructure needs. The study (Kids' Safe and Healthful Foods Project, 2013) found that:

- Most school nutrition directors (88 percent) reported needing one or more pieces of equipment to meet the current meal pattern for the NSLP. The most common gap was equipment for receiving, storing, and offering more and a greater variety of fruits and vegetables. The top five needed equipment items were utility carts (43 percent), serving utensils (42 percent), knives and cutting boards (42 percent), food processors (40 percent), and industrial scales (39 percent).
- Most school nutrition directors (85 percent) with insufficient equipment reported using a less efficient workaround. These workarounds included manually chopping or slicing fruits and vegetables because slicers and choppers were unavailable, storing them off-site and transporting them daily, and keeping them in temporary storage containers. The leading reasons why workarounds were considered inadequate included that they were costly, inefficient, and unsustainable.
- Less than half of school nutrition directors (42 percent) of school food authorities reported having a capital equipment budget, and 43 percent of these school food authorities with a budget said the budget met their equipment needs.
- More than half of all school nutrition directors (55 percent) reported needing kitchen infrastructure changes at one or more schools to meet the meal pattern requirements at lunch. The most reported need in school kitchens was more physical space for food storage, preparation, or serving (46 percent).

School nutrition programs may use grants such as the USDA-administered equipment grants to improve their meal programs. For example, The Kids' Safe and Healthful Foods Project (2016) published a case study of 19 schools. The report describes how the schools used the grant money to purchase equipment. They purchased combination (combi) ovens, steamers, and tilt skillets to increase scratch cooking. Schools bought serving lines with integrated salad bars so that students would see attractive displays of fruits and vegetables, encouraging healthier choices. Finally, schools directed money toward blast chillers, freezers, and walk-in refrigerators

Production Methods

to increase energy-efficient storage.

Production methods including scratch cooking, speed scratch, and heat and serve impact equipment needs. Scratch-based food preparation utilizes multiple culinary techniques within a recipe while prioritizing the incorporation of ingredients as close to their original state as possible to produce student-approved menu items. Speed scratch food preparation incorporates value-added food products with additional ingredients and utilizes minimal production steps to produce student-approved menu items. For example, school-made pizzas may use parbaked crusts, or a chicken salad may use USDA cooked and diced chicken. The method of heat and serve involves purchasing already-made processed foods that require minimal labor to prepare and serve.

To improve the nutritional quality of meals and meet Federal meal pattern guidelines, school nutrition programs can incorporate scratch cooking. Moving from a heat-and-serve production method to a more scratch-based approach affects the equipment needed and facility design. For example, in this project, "Return to Scratch Cooking Pilot (RSCP)," the goal was to launch a pilot program from 2017 to 2019 to learn what was needed to implement scratch cooking in all Bronx school kitchens in New York City Public Schools. The team assessed kitchens for the appropriate infrastructure to handle scratch cooking, including meeting health and safety codes. The team redesigned and reorganized workspaces into defined zones (e.g., produce preparation, hot zone) and purchased new equipment (e.g., commercial dishwashers, expanded storage). At the end of the pilot program, the team had implemented full scratch-cooked menus in two New York City school kitchens serving five schools and planned to implement scratch

Dining Options and Serving Trends

With the popularity of fast casual restaurants, students come to school looking for a restaurant-style experience in both the menu offerings and the serving and dining atmosphere. Menu preferences include more choices, healthier foods, global cuisine, and items targeted to specific student groups (e.g., performance-boosting foods for student-athletes).

Changing menu preferences requires modifying service concepts. School nutrition programs adapt by integrating several concepts simultaneously. For example, daily dining options may include a food court concept and vending machines. However, for special events (e.g., field trips), food may be taken to the students using equipment such as portable hot or cold holding containers, ice packs, and beverage coolers. Dining options include the following:

- Distributed dining is used by many school nutrition programs under special circumstances or for activities such as field trips. This approach involves taking the food to the students (e.g., in the classroom, on the bus) instead of serving them from a central kitchen with traditional serving lines. Equipment needs may include carts to transport the food, packaging equipment such as bagging or sealing machines, and holding equipment to keep the food at the correct temperature.
- Do-It-Yourself (DIY) options are meal customization options such as a taco bar, build-your-own sandwich, salad bars, and other “bars” (e.g., pasta, soup) that may also exist within a food court concept. This serving style works well for students with meal accommodations due to a disability, accommodations for students’ lifestyle, cultural, or religious preferences, or students seeking variation from the standard menu.
- Food court concepts include various specialty stations (e.g., burgers, sandwiches, stir fry), which may also consist of branded concepts (e.g., Little Italy’s Pasta). Incorporating a food court concept may require efficient use of limited space. Versatile equipment such as combination or convection ovens can handle various cooking needs. Equipment needs will depend on the menu and food court concept.
- Food trucks and pop-ups are implemented by some school nutrition programs to align with current market trends and increase meal participation. Food trucks and pop-ups offer a different and trendy service approach, which is more likely to be used in high school. Reimbursable meals are offered, but preparation often differs from what students are offered in the cafeteria. Food trucks may also be used for catering initiatives. The food truck must be appropriately outfitted with the required lighting, water, handwashing, water heater, wastewater collection items, storage, refrigeration, dishwashing and sanitizing station, and holding and serving equipment. These requirements vary by state or other jurisdiction.
- Grab-and-go cases and convenience stores may be separate store-like areas or consist of a few display cases. School nutrition programs can mimic the familiar atmosphere of

a convenience store to stock pre-packaged, reimbursable grab-and-go meals. Students benefit from this on-the-go dining option in several ways: convenience, self-service, and quicker access to items, which may be bundled with healthy and fresh choices (e.g., salads, fruits, vegetables). Equipment investments include grab-and-go carts, heated, refrigerated, non-refrigerated (dry) display cases, and beverage cases.

- Kiosks and window service typically stock *à la carte* and specialty items. Window service adds additional locations for faster service, which may ease crowded dining spaces and attract students who might not eat in a traditional cafeteria. A kiosk is typically designed for a more permanent setting. It is a fully enclosed system of carts or cabinets with a more extensive electrical system than a stand-alone cart. Window service is usually outside the area of the traditional cafeteria in a different location.
- Traditional serving lines are still utilized in school nutrition programs. Students enter the serving area and may go through a line for hot items (e.g., entrées) and another line for cold items (e.g., fruits, vegetables, drinks), which often causes congestion in the serving area. The placement of items on the serving line is an important consideration. How and where the items are displayed on the serving line can affect what students select for lunch. For example, garnishing entrées and serving whole fruit in baskets increases visual appeal and makes students more likely to consider these items.
- Vending machine offerings range from snacks to complete or reimbursable meals. School nutrition programs use vending machines as an additional point of service to provide students with items different from the traditional menu and a speedier avenue through the line.

Along with changing service options, the design of dining areas in school nutrition programs has changed. Examples include:

- Finishes in interior design elements can reflect a retail environment.
- Seating options can include lounge seating, stackable chairs, and stowaway tables, which quickly transform the space for other purposes. Tables without connected seating can accommodate students of all shapes and sizes. High-top tables provide students with the ability to sit or stand.
- Signage coordinated to match the theme of the dining area or incorporate the school nutrition program's colors or mascot.
- Space configured to support multi-purpose activities beyond dining, such as study groups, assemblies, and community groups.

Keeping current on trends and creating a hospitable dining atmosphere helps school nutrition programs increase average daily participation while serving healthy, reimbursable meals.

Farm to School and School Gardens

Farm to School is a program school nutrition programs can implement using one or more of the following core elements:

- Incorporation of locally purchased foods in school meals
- Education that engages students in agriculture, science, food, health, and nutrition activities
- School gardens that can be used for standards-based, experiential learning

The program benefits students, farmers, and communities through economic development, increased public health knowledge and healthy behavior, academic achievement, environmentally friendly activities, and equity and community engagement (National Farm to School Network, 2020). Participating in a Farm to School project or having a stand-alone garden means school nutrition professionals must ensure specific equipment is available. For example, in the Wisconsin Farm to School toolkit, equipment suggestions are provided for light processing (e.g., salad spinners, chef knives, cutting boards, wedge makers, fresh fruit preservers, food processors, slicers) and scratch cooking (e.g., wedge makers, tilt (braising) skillets, steamers, combi ovens, food blenders, panini grills, mixers) (2018a, 2018b).

Labor Considerations

Labor costs comprised 45 percent of the reported costs of producing both a School Breakfast Program (SBP) meal and an NSLP meal in the school year (SY) 2014–2015, according to a USDA meal cost study (Fox & Gearan, 2019). The report also noted that labor costs, food, and other costs per NSLP lunch were significantly greater in SY 2014–2015 than in SY 2005–2006.

In the SY 2014–2015 study, school nutrition directors rated the need for additional labor as a moderate challenge. Since March 2020, labor has become a more significant issue. In the School Nutrition Association’s (SNA) Back to School 2021 Report (2021a), 90 percent of school nutrition directors surveyed said staff shortages were a moderate to serious concern in planning for the SY 2021–2022. Forty-six percent of school nutrition directors said that since March 2020, they had reduced staffing because of financial concerns related to the pandemic (SNA, 2021a). School nutrition directors repeated this concern in the SNA Supply Chain Survey Report (2021b), with 95 percent of respondents stating that staff shortages were a moderate to significant challenge for their program. Forty-two percent of school nutrition directors said they raised salaries, and 19 percent said they added a bonus to address staff shortages.

Using specific equipment to automate the kitchen may help schools with labor costs and shortages. For example, temperature monitoring systems eliminate the need for staff to manually check and log temperatures and increase food safety and Hazard Analysis and Critical Control Point (HACCP) compliance. In addition, menu development software decreases the time spent optimizing, evaluating, and distributing menus.

Food Allergies, Meal Accommodations Due to Disabilities, and Non-Disability Meal Accommodations

About eight percent of children have food allergies, with peanut and milk being the most common (Gupta et al., 2018). The Centers for Disease Control and Prevention's Voluntary Guidelines for Managing Food Allergies in Schools and Early Care and Education Programs (2013) was developed due to Section 112 of the Food and Drug Administration (FDA) Food Safety Modernization Act, enacted in 2011. Guidelines involving equipment include:

- A written plan for how foods with allergens are kept separate from foods provided to students with food allergies.
- Rules for how staff should clean and sanitize food preparation equipment (e.g., food slicers, utensils, baking sheets) before and after use to prevent cross-contact.
- Ensuring kitchen equipment for non-allergen food preparation and serving is separate from equipment used to prepare and serve foods with allergen ingredients.
- Preparation strategies for foods for students with food allergies include preparing allergen-free menu items first and using a separate workspace and identifiable equipment (e.g., colored-coded cutting boards).
- Storage space for allergen-free products is separate from products containing allergens.

School nutrition programs making meal accommodations for students due to a disability or non-disability may require additional equipment, designated storage, preparation, serving areas, or specific utensils.

Foodservice Equipment Improvements

Foodservice equipment has benefited from technological advances, particularly in energy efficiency, water usage, and lighting, such as:

- Energy-efficient equipment such as ENERGY STAR®-certified commercial kitchen equipment saves school kitchens money by reducing utility and maintenance costs and greenhouse gas emissions. For example, an ENERGY STAR® commercial dishwasher efficiently cleans and sanitizes a large quantity of dishware quickly while being approximately 40 percent more energy efficient and 50 percent more water efficient than standard models. This efficiency represents an average

ENERGY STAR® equipment meets energy efficiency standards set forth by the EPA in conjunction with the DOE (What is ENERGY STAR, n.d.). All tested and certified equipment approved by ENERGY STAR® display the ENERGY STAR® mark.

savings of \$1,500 annually and more than \$19,000 on utility bills over the lifetime of the dishwasher as compared to standard models (U.S. Environmental Protection Agency (EPA), n.d.-a). Similarly, ENERGY STAR®-certified commercial ovens are about 20 percent more energy efficient than standard models. As a result, an ENERGY STAR® electrical convection oven will save a school about \$680 annually and \$7,450 on utility bills over the product's lifetime compared to standard models (EPA, n.d.-b).

- Lower water usage benefits facilities as a large percentage of total water use is from commercial kitchens. Using water efficiently results in both water and energy savings. For example, having staff scrape dishes of food waste before washing and sanitizing typically uses a lot of water and energy, especially if staff use a garbage disposal and run the water through the disposal to keep waste from building up and clogging the system. However, a food pulper grinds food waste and extracts the liquid from the waste, resulting in a dry pulp. As a result, the pulper will recirculate the water extracted from the food waste and significantly reduce water use (EPA, 2012). A food pulper also reduces the total volume of waste material, which decreases disposal costs.
- Light emitting diode (LED) lighting that replaces old light fixtures will provide the same brightness but uses 90 percent less energy, lasts 15 times longer, and emits little heat. Rebates for commercial buildings are available for ENERGY STAR®-certified bulbs and fixtures, including ceiling and ventilating fans with light kits (EPA, n.d.-c).
- The U.S. Department of Energy (DOE) (2022) reported that lighting use is between 10 and 20 percent of a commercial building's total energy consumption. Lighting controls such as occupancy and vacancy sensors that reduce or turn off lighting in spaces that are not occupied will reduce energy consumption from 10 to 90 percent, depending on the area.

School nutrition professionals should check with their district as there may be specific requirements regarding energy-efficient equipment purchases.

Sustainability

Schools with sustainability goals can pursue Leadership in Energy and Environmental Design (LEED) green building certification. For K–12 schools, LEED offers certification using two different rating systems: [Building Design and Construction or Operations and Maintenance](#). Schools choose the rating system that best fits the project. To obtain certification, schools use strategies to improve performance at required and optional levels and earn points. For example, one approach needed for water efficiency is reducing indoor water use by installing and using equipment (e.g., faucets, dishwashers, food steamers) that meets the LEED standard. Another strategy under Sustainable Sites is collaborating with other community organizations for joint use of school facilities, including the cafeteria. Schools earn a LEED rating based on accumulated points: Certified, Silver, Gold, or Platinum (Center for Green Schools, n.d.).

Other sustainability trends in schools, as noted by Arnold (2019) and researched by dos Santos et al. (2022), include the following:

- Changing the menu by serving less meat and more plant-based items through initiatives like “Meatless Mondays” help to reduce greenhouse gas emissions and other harmful effects of industrial food.
- Buying organic, local, and seasonal foods supports sustainability.
- Reducing organic and inorganic waste can be done through composting, recycling, donating food, and re-evaluating portion sizes. For example, in 2015, the Urban School Food Alliance (the Alliance) worked with industry to create an affordable compostable round plate. Since then, the Alliance reported that 360 million fewer polystyrene trays are going into landfills each year (Urban School Food Alliance, n.d.).
- Decreasing plate waste can be achieved through increasing seat time, adding seating areas, or updating menu items. Research indicates food waste often occurs because of limited time to eat, low student acceptance of fruits and vegetables,¹ and schools lacking the equipment and other resources to make foods acceptable to the student customer base. For NSLP meals, plate waste was highest for vegetables, milk, and fruits. Overall, plate waste was significantly higher in elementary schools than in middle or high schools (Mathematica Policy Research and ABT Associates, 2019).
- Changing purchasing practices encompasses values such as health, environmental sustainability, animal welfare, and the impact on local economies. Purchases of meat items that use humane practices with animals according to the certification program American Humane Certified and locally grown produce that comes from farms with Good Agricultural Practices (GAP) verification are two examples.
- Integrating educational activities based on sustainability, ecology, science, food literacy, and the environment can occur in the learning curriculum.

Limited time to eat is often due to a facility that cannot seat all students. Solutions to this problem include using multiple service lines, food stations, and adequate seating to meet the needs of the school’s enrollment.

A school nutrition program’s commitment to sustainable actions should be considered when planning facility design and equipment purchases and may include incorporating items such as the following:

- Energy-efficient kitchen equipment such as ovens, grills, and refrigerators that will significantly reduce energy consumption and lower utility bills

¹ Since this research, schools have used different presentation strategies, such as serving cut fruits and vegetables to increase consumption and decrease waste.

- Water-saving appliances such as low-flow faucets, pre-rinse spray valves, and energy-efficient dishmachines which will help schools save water and thus reduce water bills
- Recycling and composting bins, which will help students and staff dispose of waste properly, divert materials from landfills, and use the resulting compost to fertilize school gardens or other landscaping
- Reusable dishware and utensils that will significantly reduce the amount of waste generated by the school cafeteria
- Natural lighting as a design aspect in kitchens and dining areas with large windows or skylights to take advantage of natural light and reduce the need for artificial lighting

Kitchens as Classrooms

Within a school nutrition program, the kitchen is used to teach staff and may be used to support family and consumer science, math, and science classes for students. According to the article “School Kitchens Provide Valuable Community Resources When Class is Out” which summarizes The Kids’ Safe and Healthful Foods Project research (2016), investments in school kitchen equipment benefit the larger community, students, and staff. Activities that could be conducted in school nutrition program kitchens include afterschool culinary and nutrition classes (Scarmo, 2017).

Examples of facility design and equipment purchases to support kitchens as classrooms include the following:

- Movable furniture and equipment that can be adapted to different configurations for classroom activities
- Demonstration stations that may be mobile and include technology such as video screens, cameras, and microphones so that educators can demonstrate cooking techniques and engage with students even if they are not physically present
- Display and storage units such as glass-fronted cabinets, shelves, and storage bins, which can display student culinary creations and keep equipment organized
- Hands-on tools, including cooking utensils, food scales, and kitchen timers, which can support activities that help students gain practical skills

Emergency Preparedness

Events addressed in emergency preparedness plans usually include power outages, water outages, water contamination, sewage issues, floods, fires, and the resulting increased food safety risks such as foodborne illness. In addition, infectious disease protocols have been addressed in emergency preparedness plans since the COVID-19 pandemic. Equipment purchases to support an emergency preparedness plan may include items such as:

- Temporary handwashing stations
- Sealing and packing materials and equipment for serving meals off-site
- Personal protective equipment
- Cleaning and sanitizing supplies
- Basic utensils

The USDA's Food Safety Emergency Response Pocket Guide: Disaster Edition (n.d.) has a complete list of equipment to consider and recommended procedures.

Food Safety and Defense

The USDA Food Safety and Inspection Service (2019) recommends a comprehensive food safety defense plan that incorporates principles of the following for any organization involved in the food supply chain:

- Food safety: protecting food products from unintentional contamination
- Food defense: protecting food products from contamination intended to cause public health harm or economic disruption
- Food security: ensuring that all people can access safe food that is nutritionally sound to meet their dietary needs and food preferences for an active and healthy life

School nutrition facility design and foodservice equipment are part of a food safety and defense plan. Since food safety and food defense focus on preventing food contamination, school nutrition programs typically incorporate (or have already included) food defense actions within their food safety plan, sanitation standard operating procedures, or emergency response procedures. If a district has a central receiving kitchen and warehouse facility, the plan should start at the district level and then work to customize each site's plan.

In "Creating Your School Food Defense Plan (2017), the USDA recommends that school nutrition professionals mitigate risks using strategies such as:

- Monitoring of foodservice equipment when in use to prevent initial contamination during storage or preparation

- Purchasing an emergency supply of disposables so that they can be used in case the usual utensils, trays, or other equipment items are contaminated
- Evaluating whether employees are trained to check equipment for wear, tear, and tampering
- Prohibiting the use of the foodservice area for special events unless foodservice staff is available to supervise
- Using security equipment (e.g., cameras, locks) and planning how to prevent unauthorized access by non-foodservice staff

In addition, school nutrition kitchens need specific equipment to document critical control points to ensure food safety. For example, temperature monitoring systems are available for cold storage areas and food production, holding, cooling, and reheating. Health codes generally require items such as sneeze guards for food tables. Storage containers ensure the product is stored according to manufacturer instructions to avoid cross contamination, the temperature is controlled, and the product remains pest-free. Standard operating procedures for food safety should include the cleaning and sanitizing of equipment. The right facility design and equipment will strengthen a school nutrition program's food defense and safety plan.



Chapter Three

Planning the Project and Understanding the Architectural Process

CHAPTER THREE OBJECTIVES

After reading this chapter, the school nutrition professional will understand the following:

- Methods for gathering input for the Program Profile
- How to complete the Program Profile
- The architectural process and how to work with the external team and independent consultants
- How to read and understand commercial kitchen architectural drawings

Aspects Impacting Facility Design

The main aspects that impact the planning and design of the facility are the customers, menu, current facility and equipment, budget considerations and funding sources, and whether the project involves new construction or renovations. Standalone equipment purchases usually do not require extensive research on these factors. The planning team must gather information in each area and put it into a cohesive document, a Program Profile, which thoughtfully considers the factors above.

Gathering Input for the Program Profile

Now that the planning team is established and understands the school nutrition program requirements and national trends, it is time to complete a Program Profile, which will influence all equipment purchasing decisions and reflect all facility requirements. A Program Profile guides the project's planning, design, and budget and ensures the finished product meets the needs of the school nutrition program. It can also be a communication tool to inform other stakeholders about the project details. With a Program Profile, the planning team will discuss

the project in an organized and consistent way, supporting collaboration and a successful outcome. The Program Profile template in Appendix A includes all the main areas that should be considered, and it can be modified as needed for individual school districts. Photos and videos can be included in the Program Profile to showcase the gaps in the current facility for future conversations or presentations.

The planning team must consider the budget and funding sources from the start. For example, a renovation or new construction that involves replacing or renovating a facility system or element is a capital project. Capital projects might be paid for from the district operating budget, capital reserves, or through a bond issue. Smaller projects (e.g., minor renovations) or equipment purchases might use Federal funding grants (e.g., [NSLP Equipment Assistance Grants for School Food Authorities](#)), philanthropy funds, school discretionary funds, non-profit food service accounts, or other tax revenues. School nutrition professionals should consult with district officials and their State agency on the appropriate use of the non-profit food service account. The school board and other authorities need time to review the needs documented in the Program Profile and develop a plan of action to fund the project.

As the planning team members develop the Program Profile, input from other stakeholders ensures that multiple perspectives are considered. Everyone, from school nutrition staff to the independent consultant, has something valuable to add and appreciates being included in the process. When asking people to give their input, outline the expectations, including the extent of their participation and the requested deadline. The school nutrition professional should emphasize that their perspective is respected. Also, let them know how their input will be used, if it will remain confidential or with whom it will be shared, and if and when they will receive a summary of the results.

Feedback should be gathered in various ways to accommodate different communication styles. For example, some people may not feel comfortable expressing their opinions verbally in a stakeholder meeting, especially if they do not feel like one of the experts in the room. Other people prefer to write down their thoughts rather than share them verbally. Also, using multiple methods to gather input helps gain a comprehensive assessment. Two different information-gathering strategies may yield contrasting results. For example, school nutrition employees might say the dishwashing setup works fine. Still, observational results show that proper sanitation is not being followed. Finally, how the planning team gathers information may vary based on the process timeline. For example, group meetings may be common early in the process, with one-on-one sessions becoming important later. Table 5 presents different methods for gathering feedback with the advantages and disadvantages of each.

Table 5**Methods for Gathering Program Profile Information from Stakeholders**

Method	Advantages	Disadvantages
One-on-one Meeting	<ul style="list-style-type: none"> • No distractions or interruptions from others • Can follow a template of questions to ask everyone • Easy to see the emotional response 	<ul style="list-style-type: none"> • Time-consuming for both parties • Requires scheduling • Quality of the input depends on the facilitator to capture the feedback accurately and without bias
Group Meeting	<ul style="list-style-type: none"> • Participants often find the discussion engaging • Easy to see points on which participants agree or disagree • Easy to observe body language 	<ul style="list-style-type: none"> • Some participants might dominate the conversation • Some participants might find the conversation overwhelming or intimidating • Often hard to coordinate schedules
Survey	<ul style="list-style-type: none"> • Easy to administer and analyze • Free survey tools • Multiple question types (e.g., rating scale, multiple choice) 	<ul style="list-style-type: none"> • Some participants might not be familiar with online surveys • May get a poor response rate and little information • Participants might have different interpretations of the questions
Email	<ul style="list-style-type: none"> • Quick and easy • Feedback can be given at any time 	<ul style="list-style-type: none"> • Not everyone checks their email regularly • May be a tedious way to provide lengthy input
Reports	<ul style="list-style-type: none"> • Can give a historical perspective • Provides quantitative data (i.e., counts) • Does not depend on anyone's participation 	<ul style="list-style-type: none"> • Might not include all the data or time frame needed • Might be hard to access • Time-consuming to read through and interpret reports
Observation	<ul style="list-style-type: none"> • Good way to see people interacting in the natural environment • Allows for detailed descriptions of behaviors • Does not depend on the participant's willingness to report 	<ul style="list-style-type: none"> • Participants might change their behavior if they know they are being observed • Time-consuming • Observers might be biased in what they see and report

As information is collected and analyzed, the planning team should ask follow-up questions to obtain more information or clarify confusing points. Clear communication in developing the Program Profile is essential. The goal is to build consensus on the Program Profile while listening to and considering alternative perspectives.

Completing the Program Profile

Each area of the Program Profile covers different aspects of facility design and equipment purchasing (see the overview in Table 6). While the school nutrition professional and other school staff are usually familiar with many areas in the Program Profile, other planning team members may have specific areas of expertise. Planning team members should only be engaged in the parts of the Program Profile for which they have experience. The school nutrition professional should take time to document everything so that all program information from team members is captured.

Table 6

Program Profile Overview

Profile Section	Section Information Description
(I) Contact Information	<ul style="list-style-type: none"> • Project name, school district, address, project budget • Name, phone number, and email of each member of the planning team
(II) Major Milestones	<ul style="list-style-type: none"> • Projected start and end dates, team members, and notes for each phase of the building project
(III) Site Information	<ul style="list-style-type: none"> • Grade levels, student ages, school capacity, and projected enrollment of site • Types of meal service offered • Projected meal counts by meal service
(IV) Notes on Stakeholder Input, Previous Project Successes and Challenges, and Trends	<ul style="list-style-type: none"> • Preferences noted • Uniqueness of the current program • Competitors and their offerings • Previous project successes and challenges • Trends affecting future operations

Profile Section	Section Information Description
(V) Meal Service Information	<ul style="list-style-type: none"> • Numbers and lengths of all meal periods • Meal service types (e.g., breakfast in the classroom)
(VI) Menu and Storage Requirements	<ul style="list-style-type: none"> • Average case counts of food items served • Storage requirements (dry, refrigerated, frozen)
(VII) Type of Food Production System	<ul style="list-style-type: none"> • Type of facility (e.g., on-site production, serving, satellite)
(VIII) Type of Production	<ul style="list-style-type: none"> • Production methods (e.g., cook and serve, rethermalization)
(IX) Type of Meal Service Systems	<ul style="list-style-type: none"> • Serving methods (e.g., food court, salad bar, traditional serving line)
(X) Dining Area	<ul style="list-style-type: none"> • Areas and seating capacity where meals are served
(XI) Service Considerations	<ul style="list-style-type: none"> • Payment methods • Merchandising • Condiment location(s) and dispensing methods • Beverage dispensing methods • Water dispensing method • Types of tableware
(XII) Cleaning and Sanitizing	<ul style="list-style-type: none"> • Types of cleaning and sanitizing equipment (e.g., dishmachine, three-compartment sink) • Dedicated cleaning and sanitizing areas included (e.g., mop room, garbage can wash, laundry facilities)
(XIII) Waste Disposal	<ul style="list-style-type: none"> • Waste disposable and recycling systems
(XIV) Employee Facilities	<ul style="list-style-type: none"> • Restroom facilities • Employee lockers • Office including furniture and equipment requirements • Staff break room • Time clock
(XV) Technical Information	<ul style="list-style-type: none"> • Utilities (e.g., natural gas, electricity) • Electrical voltage and phases
(XVI) Large Equipment Selection Matrix	<ul style="list-style-type: none"> • Large equipment needs based on cycle menu and production type
(XVII) Other Considerations	<ul style="list-style-type: none"> • All other considerations that may influence kitchen design, equipment selection, and facility usage

The Contact Information Section of the Program Profile (see Section I) collects the pertinent project, personnel, and contact information. In addition, important dates are noted for the planning team in Section II, which should be updated as the schedule changes. A thorough description of the site and customers helps the planning team understand needs and expectations, translate those into the facility design, and purchase the appropriate equipment (see Section III). Using the data collection methods described, the planning team will gather input from guardians and students on preferences, what is unique about the current program, and competitors to the school nutrition program (see Section IV). A review of trends in Chapter Two will help the planning team identify and understand the desired future production, serving, and dining methods and how the facility design and equipment purchases will need to accommodate the future vision (see Section IV). For example, will the program use more local produce because of a Farm to School program? Do menu choices need to be expanded for different student groups, such as student-athletes or those who need meal accommodations?

The planning team should evaluate successes and challenges to inform future projects from receiving through waste removal. This review will improve the workflow, labor efficiency, cost-effectiveness, and maintenance of food safety standards in the new or renovated facility (see Section IV). Priorities like sustainability should be identified to create benchmarks and guide design and purchases. Depending on the type and size of the renovation, not all sections of the Program Profile will be applicable.

Meal service information is recorded in Section V. Future customer counts can be estimated by looking at projected enrollment data and using current participation rates. The Superintendent's office, the local Chamber of Commerce, or the Center for Economic Development might have historical population and enrollment data to help the planning team analyze:

- How the population in the district has changed over the last five to ten years
- How the population in the district will likely change over the next five to ten years
- What age groups might be most affected by the changes (e.g., more young families with children moving into the district)
- How population changes will affect overall enrollment
- What student groups might be most affected by the changes in enrollment (e.g., more elementary students coming in)

This customer data also guides how the school nutrition program attracts and retains staff. The planning team can ask the school board about proposed or upcoming changes to the school schedule, as those changes may impact how and when meals are served. For example, Schweitzer (2010) notes that the length and scheduling of lunch times affect student meal consumption.

The saying in school nutrition is that “the menu drives everything.” What is on the menu dictates what is purchased and stored. Section VI outlines the main menu categories and storage requirements for the planning team to evaluate current storage capacity and future needs. Changes, such as serving or production methods, affect which products are needed and, therefore, the storage of those products. In addition, various products (e.g., dry, frozen, chemical

supplies) have different requirements for safe and secure storage. Delivery schedules from food and product vendors can impact the amount of inventory on hand and available storage space, affecting the purchasing process of food and supply products. For example, weekly produce deliveries may require more storage space than deliveries made twice per week.

A comprehensive assessment of the facility's production systems and design helps to envision and document what is needed for the future facility (see Sections VII–IX). The planning team should factor in menu preferences, operational efficiencies, quality control, capital costs, budget, labor considerations, facility characteristics, and the condition of the equipment. The best kitchen operation provides tasty, nutritious food and quality service, supports increased program participation, and uses cost-effective food and labor to reach a profit margin that allows reinvestment into the school nutrition program (Schweitzer, 2010). The planning team should ask about the flexibility and adaptability of the proposed design and equipment so that there is the ability to expand, reduce, or reorganize the program and system when the customers' needs and expectations change.

The projected student enrollment will inform service options and seating capacity (Sections IX and X). As the planning team reviews Sections XI and XII, they should consider regulations that dictate the cleaning and sanitizing of utensils, equipment, and the facility itself, along with waste disposal (Section XIII), as poor handling of these activities can increase the likelihood of foodborne illness. The needs of the employee facilities are documented in Section XIV and should be informed by the relevant health codes.

The technical section (see Section XV) documents utility requirements, which are vital when renovating. Evaluating the condition of the various systems and whether they meet current building codes is critical at the project onset, as any major renovations will add significantly to the budget. For example, air handling systems and equipment may not be up to date or provide adequate cooling and heating.

Thinking through and planning for future growth is more cost-effective than doing it a few years later. When discussing future needs, the electrical engineer should design the electrical service to supply adequate power for the new equipment and incorporate additional capacity. Mechanical and plumbing systems are often challenging to change or add on to and typically require additional square footage or significant changes. For example, plumbing lines are usually set in the concrete floor, making tearing out the concrete and adding or replacing lines a considerable expense.

Building codes may have changed since the facility was built. Utility companies often evaluate existing structures and assist in calculating how much capacity is available. Newer equipment usually has advanced features that require engineering, and these adaptations must be included in the budget, along with the relocation of any electrical panels.

During the equipment audit (Section XVI), document what is currently available, note any advantages or disadvantages, and what pieces will be kept. Then, when considering future equipment purchases, remember to reference the menu, trends, customer, and technical sections, as these items should justify equipment purchases. For example, multi-use equipment supporting an expanded menu may initially be more expensive but provide a better return for the money over the long term. Equipment purchases should also support environmental priorities, such as sustainability or certification. Refer to Chapters Five through Seven for detailed information on making equipment choices and fact sheets on large and small equipment.

Section XVII documents any other considerations. Chapter Four covers facility design and details layout and space guidelines. When gathering information for the Program Profile, the planning team should document design requests and submit recommendations. Once the input is collected, the school nutrition professional and other planning team members finalize the Program Profile. This process may be complex, as budget considerations and funding sources often affect how wants, needs, and future growth are factored into the current project.

Understanding How to Work with Construction and Design Consultants

The architectural design and construction process is typically outlined in six phases, noting that for some projects, steps may be combined, while for others, there may be additional steps (see Table 7). Each phase needs a schedule with deadlines noted, as subsequent tasks are often contingent upon the previous tasks being completed. Any delays should be explained, and the timeline adjusted as required. The planning team should submit documents for review to inspection and approval agencies such as the local health department and municipal electrical inspectors promptly and on schedule. State requirements also often dictate plan and specification approvals that must be obtained before the planning team can advertise for bids, so these approval items must be included in the schedule.

Each phase has specific objectives, activities, and things for the planning team to consider (see Table 7). The Program Profile is completed in Phase One. For renovations, the planning team should locate the existing architectural drawings and verify their accuracy before any design or planning is completed. These drawings might be found in school files, the district maintenance or facilities office, or the local building department office. The original architect may also have a copy. The structural engineer will evaluate the existing facility for capacity (e.g., appropriate loads), while the electrical and mechanical engineers will audit their respective systems for adequate capacity, expansion ability, quality, and condition.

The architect and design team complete the design sketches in the schematic design phase (Phase Two). The planning team should understand how to read the architectural drawings as these initial drawings reflect the basic concepts of the design, including spatial relationships, site plans, floor plans, and elevations (see the section on Tips for Reading and Understanding Commercial Kitchen Architectural Drawings on page 45). The planning team should review these drawings for functionality, usability, code compliance, security, safety, and aesthetics. These schematic designs verify or, if necessary, revise the total square footage, project budget, project schedule, and occupancy dates. Any errors or omissions should be identified and fixed. Critical reviews and approvals with authorities and other experts are completed during this phase.

The approved schematic designs are finalized during Phase Three, the design development stage. The construction documents created in Phase Four, construction documentation, are drawn to scale and include all plans: site, architectural, structural, plumbing, mechanical, electrical, and other plans completed by specialty consultants (e.g., foodservice consultant). Phases Five and Six are bidding and awarding the contract and then the construction administration of the project, respectively, which are covered in detail in Chapters Eight through Ten.

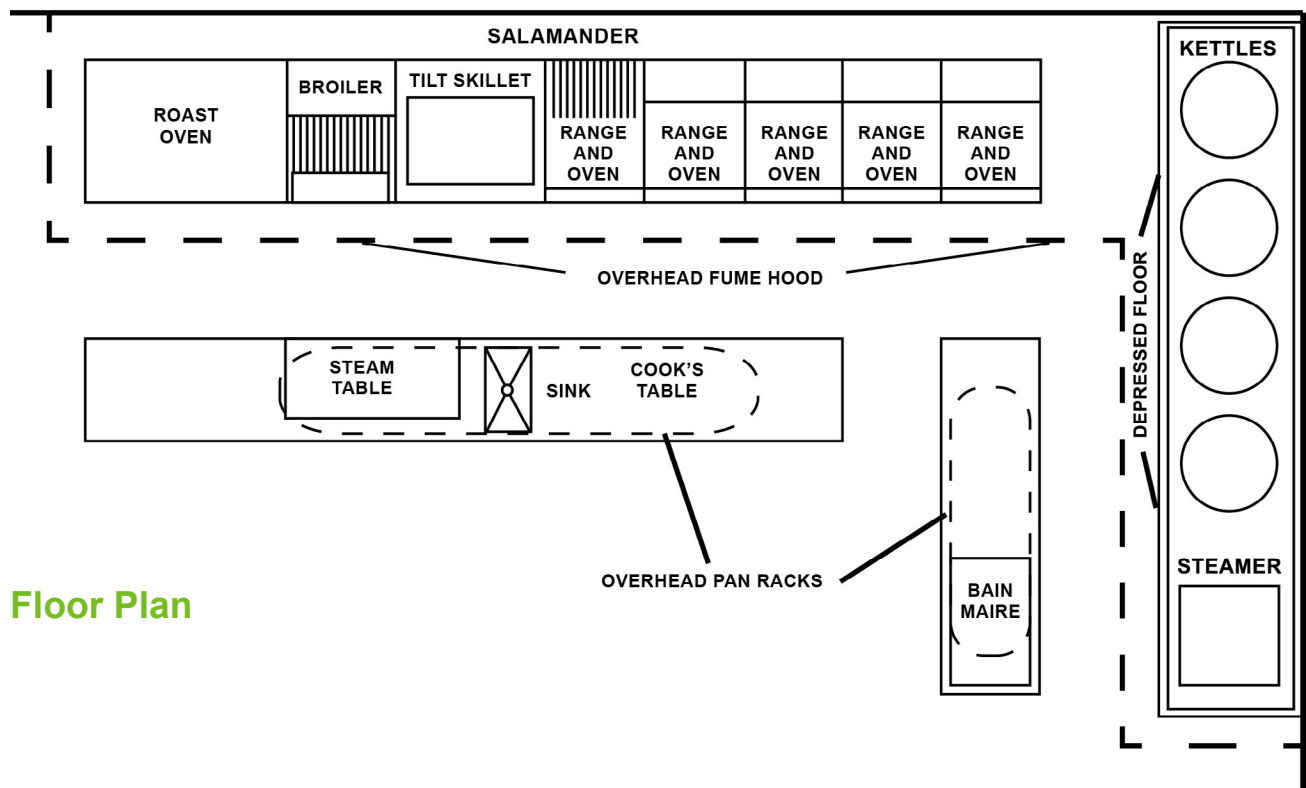
Table 7

Six Phases of Design and Construction Projects

Phase	Objective	Activities	Things for the Planning Team to Consider
1: Programming	Establish the requirements for your project using the Program Profile	<ul style="list-style-type: none"> • Establish goals • Collect and analyze data • Formulate and test concepts • Determine needs • Specify the design problems 	<ul style="list-style-type: none"> • Changes to the design in this phase are the easiest and most cost-efficient • Realize that there may not be alignment between desires, needs, and budget
2: Schematic Design	Approve design sketches	<ul style="list-style-type: none"> • The design team creates initial design solutions based on identified needs and problems in Phase One of programming. • These sketches may incorporate the overall layout of specific spaces (e.g., the serving line) and consider how the design fits within the larger school learning environment (e.g., a school garden). 	<ul style="list-style-type: none"> • Understand that initial sketches are a starting point • Ask how the design will meet the requirements established in the programming stage and documented in the Program Profile

Phase	Objective	Activities	Things for the Planning Team to Consider
3: Design Development	Develop detailed drawings and cost estimate	<ul style="list-style-type: none"> • Detail is added to the approved schematic. • The overall structure is enhanced by ensuring each space within works well together. • Primary materials and finishes are specified. 	<ul style="list-style-type: none"> • Evaluate whether the detailed drawings: • Have good traffic and workflow • Space serves the intended purpose • Design aesthetics work
4: Construction Documentation	Prepare construction documents, which include detailed drawings and specifications, including architectural, mechanical, plumbing, structural, and electrical aspects, which the contractor uses to finalize cost and build	<ul style="list-style-type: none"> • Drawings for all parts of the project, from specifications for materials, colors, and equipment, are translated into construction documents. • The project's overall structure must remain intact if changes are made to meet code requirement 	<ul style="list-style-type: none"> • Understand that these drawings and specifications are part of the contract
5: Bidding and Awarding the Contract	Send out bid documents and select a contractor	<ul style="list-style-type: none"> • The architect may assist in recommending and selecting qualified contractors. • May need to hold a pre-bid conference to answer questions and address the concerns of potential bidders 	<ul style="list-style-type: none"> • Evaluate the following: <ul style="list-style-type: none"> ▪ Years of experience on similar projects, contractor's references, and past performance ▪ Capacity of contractor ▪ Bonding capabilities ▪ Ability to work in a school district's team environment

Tips for Reading and Understanding Commercial Kitchen Architectural Drawings



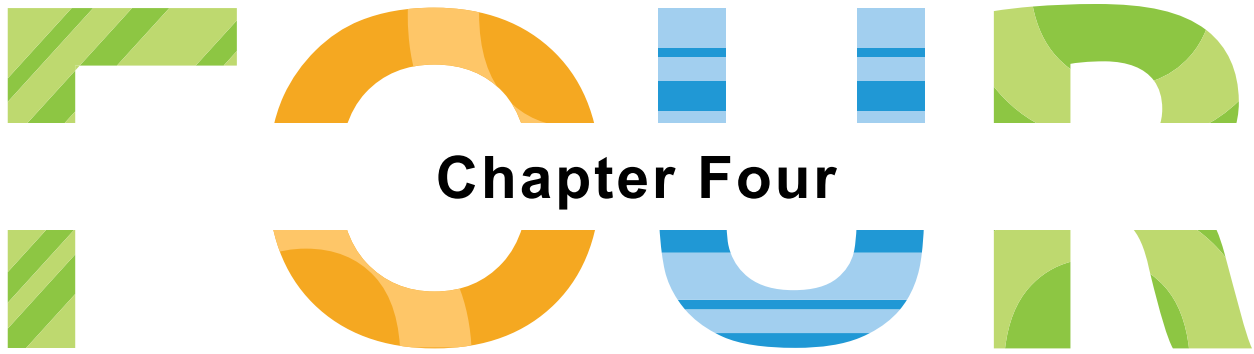
Floor Plan

Architectural drawings will include three types of documents. Understanding what view each represents will help to visualize the project in its entirety:

- A floor plan allows the viewer to look down into the facility without its roof, showing the exact size and outline of a floor, including every wall, door, window, and other interior construction. Floor plans were previously called blueprints.
- A section (or sectional) drawing is a two-dimensional drawing of the facility as if it had been sliced vertically. Section drawings show details of the building not readily visible in the floor plan (e.g., ceiling height, foundation thickness) and detailed layouts of design elements (e.g., equipment, fixtures).
- An elevation drawing is from a vertical plane as if the viewer were standing in front of the facility and looking straight at it. Elevation drawings illustrate building form, materials and overall style, floor and plate heights, roof pitch and style, and window openings.

The ability to interpret these representations is critical to serving as an informed team member and ensuring that the intended final outcome is achieved. Look at the scale, the kitchen plan, notes, the overall site plan, as well as the structural, plumbing, mechanical, and electrical plans to understand what is being depicted on each document.

- Plans are drawn to a scale, typically $\frac{1}{4}$ inch equal to one foot. The planning team may take a tape measure into an existing kitchen to visualize the space.
- Read the kitchen plans starting from the upper left corner and work down to avoid missing anything.
- The plan cover sheet contains project information, often including a picture of the finished project.
- Read the notes on each page as they contain important information.
- Start with the site plan, which will give an overhead view of the site and outline the boundaries and orientation of the building (usually labeled starting with a C).
- Once the site plan is reviewed, move to the architectural plans, designated with an A, which indicate measurements, elevations, and locations of walls, windows, bathrooms, and other structures.
- Structural plans are labeled with an S followed by a number and contain foundation and framing plans.
- Plumbing plans are marked with a P followed by a number and show the plumbing rough-in and the floor plan.
- Mechanical plans are labeled with an M and show the location of heating, ventilation, and air conditioning (HVAC) equipment, ductwork, refrigerant piping, and control wiring.
- The location of circuits, panel boxes, fixtures, and other electrical elements are found on the electrical plan, which will be labeled with an E.
- Other consultants, such as the foodservice consultant, have additional drawings and specifications to review.
- Read the specifications. They indicate quality standards, materials, model numbers, and other information needed.



Chapter Four

Facility Design: Recommendations and Guidelines

CHAPTER FOUR OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- How State and local guidelines dictate layout and space guidelines
- How to use the Program Profile to inform layout and space guidelines
- General guidelines for facility design
- Characteristics and design recommendations by workspace, including consideration regarding surfaces, flooring, walls, ceilings, windows, and doors
- Energy sources and conservation planning
- Plumbing, ventilation, and code and regulation considerations

Now that the Program Profile is finalized, the work of the planning team continues to be guided by the design specifications. School nutrition professionals should have a working knowledge of each phase of the design and construction process to understand the terminology used by consultants and experts, be able to ask questions, and contribute as a team member. Requirements vary by State and local jurisdiction, and the following are general recommendations and guidelines unless otherwise referenced by an oversight agency. The planning team should use the references cited if more details are needed. Checklists for renovations, additions, and new construction are found in Appendices B and C.

If the project involves renovation, the original architectural drawings help when thinking through the initial design. A structural engineer should verify all drawings by taking existing measurements and determine structural integrity before renovating. For example, a walk-in freezer will be added to an existing kitchen. In that case, a structural engineer is needed to decide if an existing wall can be modified or removed to accommodate the new freezer. If a heavy piece of equipment is added to a kitchen in a building with a basement, an assessment should be made to determine if the floor joists will support the weight of the equipment. Because the kitchen and dining areas are costly to renovate, the planning team should consider the following overarching concepts.

Layout and Space Guidelines

State and local guidance and approval agencies typically dictate guidelines for square footage. School nutrition professionals should check with these agencies for allowable footage to plan the layout and space. The information gathered for the Program Profile influences the layout and space design. For example, the number of students served affects most facility areas. The greater the number of students, the larger the kitchen may have to be, and the more storage space that will be needed to accommodate the volume of products. Also, school nutrition professionals should consider future capacity needs.

When planning for the layout and placement of equipment, the planning team should consider the following:

- How much space is needed to keep the equipment unobstructed and clean
- Workflow efficiency
- Whether casters, gliders, or wheels should be used for moveable equipment
- If quick disconnects of flexible utility lines should be present for equipment with gas or electrical connections
- How to set up floor-mounted equipment and ensure a permanent seal around the entire perimeter on a smooth, non-absorbent masonry base
- If the equipment is on legs, the required six-inch clearance between the floor and the equipment to allow for cleaning
- If the equipment is not easily movable by one person, a minimum of six inches of clearance under the equipment is needed for cleaning. For example, allowing enough space to clean condenser coils and for ventilation helps keep refrigerators and freezers operating at maximum efficiency.
- If the equipment is mounted to the counter, the need to seal or raise on approved legs that provide a minimum of a four-inch clearance between the counter and equipment for cleaning
- Other layout requirements, as outlined in The Conference for Food Protection (2016) guide

When designing the facility, the planning team should incorporate the general principles listed above as applicable. Regulations dictate some design features, such as those impacting food safety and accessibility. Other design features may encourage healthy eating, increase staff efficiency, improve workflows, and enhance the flexibility and modularity of the space and equipment.

Healthy Eating Design Guidelines for School Architecture

Huang et al. (2013) designed the Healthy Eating Design Guidelines (HEDG) for School Architecture to help those designing school food environments do so in ways that encourage healthy eating among students while remaining architecturally sound. School nutrition professionals can use this tool in planning their equipment procurement and facility design. HEDG identifies five core principles for each area:

- The provision of equipment and spaces to support fresh and healthy food choices in the school and community
- Facility planning that allows collaboration of the school community in food preparation and production
- The use of behavioral science principles to positively influence healthy eating behaviors and attitudes
- The integration of building and landscape characteristics to raise awareness of healthy and sustainable food practices
- The conceptualization of school spaces as community assets to support school-based healthy initiatives

Workflow

Workflow impacts staff efficiency and the risk of foodborne illness by preventing cross-contamination. The layout and space of the kitchen and surrounding areas should support ease of movement of staff, food, and supplies in a logical direction. As mentioned in Chapter Three, the menu influences all areas of a school nutrition operation, so the determination of whether the areas will be appropriate to meet programmatic needs should be based on the menu. The facility's capacity will also impact the ability to handle the types and amount of food being prepared and served. Food flow typically follows three processes:

- Food processes with no cook step (e.g., salads, deli meats)
- Food preparation for same-day service (e.g., hamburgers, steamed vegetables)
- Complex processes that require two or more trips through temperature danger zones (e.g., hard-boiled eggs that are boiled, cooled and hot leftovers that must be cooled and reheated) (Conference for Food Protection, 2016)

Complex processes present increased risks for foodborne illnesses due to preparing and holding for extended periods, cooling and reheating, and passage through the danger zone of 41 °F to 135 °F more than once.

When developing the workflow, the planning committee should consider common types of design:

- The straight-line flow plan (also called an assembly-line flow) is used when the food moves in one direction, which may be in a straight line, circle, or a U-shaped or L-shaped path. This flow plan is helpful when standardized menu items are made in large quantities, such as in a central kitchen.
- The functional flow plan (also called a process plan) organizes food production areas into departments (e.g., cooking, fruit and vegetable preparation, salads). Facilities that produce smaller quantities of a variety of food find this plan works well.
- An open design has a floor plan that encourages engagement and has food preparation and cooking stations that can be viewed from other areas, such as the dining area.
- A closed design has a compartmentalized layout of stations hidden from people working in other areas..

Within each area, there are three parts to the layout:

- The work center is the basic unit in the layout and where closely related tasks are completed by school nutrition professionals (e.g., the salad preparation area). The design goal is for the work center to be self-sufficient but flexible enough to accommodate other functions. Mobile or dual-use equipment helps with flexibility and lower equipment costs as items can be moved between multiple work centers.
- Work sections are work centers arranged for one type of activity (e.g., a produce wash sink, fruit and vegetable preparation area). Workflow should follow a logical sequence of operations so that food moves forward from receiving to serving and dishwashing most efficiently.
- The total layout is all the work centers and sections combined. The total layout should be efficient overall, accommodate the work and activity of school nutrition professionals during peak times, and be flexible in configuration in case the program's needs change.

Consider the following points researched by The University of California Ergonomics Project Team (2012) based on the concept that the overall activities of most kitchens follow these steps: Delivery › Storage › Food prep › Cooking › Serving › Cleaning. Within each step, aim to visualize the facility during operation as menu items are safely received, stored, prepared, and served or transported for service. Evaluate the following:

- How staff move between areas and the distance traveled, and whether it is optimized
- How materials and products are brought in from the loading dock or delivery area to the storage area
- How far equipment or product is stored from where it will be used

- The transport of products from the preparation area to the storage area
- The flow of students from the entrance of the facility through the service area to the dining area, ending at the dish drop-off area
- How dishes and utensils get to the dishwashing area and then back to the food production or service area
- How entryways and exits dictate activities such as deliveries and service
- Where food enters and exits the kitchen
- The length of distances between work stations, which should be short and avoid crossing other paths
- If all areas of the operation are visible and areas of food production or meal service are unobstructed

In addition, consider the following:

- Points of possible congestion along the flow of food
- Number of staff working in the space and how flexible the work arrangements are
- Amount and type of equipment and the extent to which it can be mobile
- The location of the equipment near the intended workstation (e.g., the walk-in refrigerator is located near the produce preparation area, slicer is located near the sandwich preparation area)
- Door clearance for equipment and materials
- Number and types of meals prepared and served
- Storage space needed
- Adequate aisleway width (e.g., two people can pass each other, carts and racks can move through the space)
- Routes for garbage removal without the risk of cross contamination

Ergonomics

The top five areas of ergonomic risks and example design guidelines in foodservice facilities in a study by the University of California (2012) were:

- Food preparation (e.g., stirring, chopping, peeling)
- Manual material handling in the kitchen (e.g., transporting pots and pans, small kitchen equipment, trays of food)
- Stocking and retrieving items from the storeroom
- Transporting food to other locations
- Dishwashing

During the design phase and before purchasing equipment, evaluate risks in each work area and implement strategies such as the examples below to minimize injuries and maximize productivity.

- Purchase and use pre-cut/pre-peeled foods or automated equipment where needed (i.e., when it is difficult to manually cut foods such as carrot sticks or dice butternut squash).
- Use anti-fatigue mats in food prep or other areas where school nutrition professionals must stand for extended lengths of time.
- Work surfaces should have a height range of at least 28–44 inches. Adjustable work surfaces accommodate different employee heights, simplify food preparation tasks, and reduce ergonomic risks.
- Work tables should be positioned so that tools or food are within 24–36 inches of the center of the school nutrition professional’s waistline.
- Purchase carts with vertical handles with good grips for food transportation.
- Use mobile equipment in storerooms to accommodate changing needs and easier cleaning. Heavy items should be shelved between mid-thigh and chest height.
- Consider using mechanically refrigerated salad bars instead of ice for cold holding.
- In the dish room, install a nozzle 40 inches from the floor with a locking mechanism on the trigger to reduce repetitive and sustained motion.
- Purchase an automated washing system for pots, pans, and baking sheets.
- Evaluate the impact of temperature, humidity, lighting, and noise levels, which will impact productivity and increase accidents and injuries. For example, too much light will produce a glare.
- Decrease noise levels by controlling noise at its source or isolating the noise source. Materials (e.g., acoustical ceiling tiles), layouts (e.g., separating dining areas from dish return area), and design (e.g., chairs with glides) also aid in absorbing or breaking up the noise.
- Store frequently used tools so they can be easily accessed with minimal travel and place products used in high volume between the mid-thigh and chest height of the average school nutrition professional.

Accessibility

When planning facility design and equipment purchases, it is critical to consider accessibility issues related to three pieces of legislation regarding individuals with disabilities.

- Section 504 of the Rehabilitation Act of 1973 is a civil rights law prohibiting discrimination against individuals with disabilities at schools that receive Federal funding.

- The Individuals with Disabilities Education Act (IDEA) of 2004 requires public schools to provide appropriate services to meet the needs of K-12 students with disabilities.
- The Americans with Disabilities Act (ADA) of 1990 prohibits discrimination against individuals with disabilities by schools, employers, and anyone else who offers goods and services.

To ensure government and commercial facilities and public accommodations are accessible to and usable by individuals with disabilities, the U.S. Department of Justice published the 2010 ADA Standards for Accessible Design (“Standards”). These Standards set minimum design and construction requirements for newly constructed or renovated facilities, so they are accessible for people with disabilities. Other regulations may apply, and the most stringent requirements are followed where there is overlap.

In 2020–2021, 15 percent (7.3 million) of all public school students received special education services under the IDEA (National Center for Education Statistics, 2023). Therefore, facility design must consider physical access, lighting, colors, acoustics, and view of the outside environment. Specific standards for school nutrition facilities to adhere to ADA and other regulations are complex, with many exceptions. In addition, requirements are age-specific (five years and younger, six to 12 years, and 12 years and older) to accommodate different size requirements. The nutrition program’s accessibility design considerations include but are not limited to the following:

- Width requirements for doors and aisles
- Height and knee space requirements for seating and standing surfaces
- Wheelchair accessibility in restrooms and dining rooms
- Minimum and maximum height requirements for soap dispensers, hand dryers, faucets, water fountains with a water bottle filler, and other fixtures
- Flooring requirements
- Signage that requires tactile, visual, or pictogram signs, along with specifications for layout, size, and height requirements

It is a best practice for water fountains to include a water bottle filler.

Because the Standards are complex with multiple exceptions, an accessibility expert should assist with designing and constructing the facility.

Flexibility and Modularity

As meal pattern requirements change and trends evolve, the menu will also change. The facility may need to adjust to these changes. Designing the space to use equipment such as shelving units, racks, and prep tables with wheels that can adapt to changes is essential. Using quick-connect utility lines also allows for changing the design (The University of California Project Team, 2012). For example, a hot food holding cabinet may be equipped with casters to be loaded in the kitchen, unplugged, and then moved out to a nearby serving area to be plugged back in. Facility design should consider ceiling electrical drops for small equipment (e.g., immersion

blenders, food processors). Equipment being replaced should also be flexible in use and withstand continuous use. For example, flooring should be selected that tolerates daily cleaning and the use of heavy carts.

Security and Safety

As discussed in Chapter Two, the USDA recommends a school food safety and defense plan to reduce the likelihood of unintentional and intentional contamination. In addition, staff and student theft is an issue for school nutrition programs. While schools often have a safety and security plan (often called a violence prevention program), it may not always include strategies specific to the school nutrition program, such as:

- Limiting the number of doors to the storage areas
- Installing cameras to view the back door and other areas that are not readily viewable
- Keeping receiving doors locked with access given via buzzer or intercom system
- Using a peephole for viewing visitors requesting access
- Limiting the number of locks that are part of the master system
- Having locks on all windows
- Enabling storerooms or other areas to be opened with badge access given to only those staff who need it
- Tracking products in inventory to quantify what has been used and what should still be on the shelf
- Placing the office of the school nutrition director or manager so they can see storage and loading areas
- Designing separate rooms for plumbing, mechanical, and electrical equipment
- Having the equipment to document critical control points, avoid cross contamination, and meet health codes

Aesthetics, Branding, and Communication

Design elements such as color, material choices, wall graphics, displays, and artwork create a visually pleasing environment for students and school nutrition staff. These design elements can incorporate school colors and mascots and relevant community messaging. Messages that can be communicated to customers using signage, wayfinding, and marketing should also be considered in facility design and complement design aesthetics.

Design Recommendations by Workspace

Receiving

A well-planned receiving area aids in the secure delivery and receipt of food and supplies unscathed by theft, vandalism, temperature loss, or contamination. This area should have easy access to the street but be located away from student areas (e.g., playgrounds, crosswalks). The back door to the kitchen should be at least 42 inches wide, and a minimum amount of interior space should be designated for checking-in deliveries.

A loading dock or a retractable platform, along with material-handling equipment (e.g., dollies, carts), makes receiving and moving food and supplies into storage areas easier. If a loading dock is used, Schweitzer (2010) suggests the following characteristics:

- A minimum of eight feet of depth, with the length determined by the number of trucks expected at any one time multiplied by the width of those trucks (typically 10–15 feet per truck)
- Adequate weather protection with the roof higher than the top of the tallest truck
- A floor level at the same level as the kitchen
- Location three to three and a half feet above grade for easy unloading
- For a raised dock, concrete steps that are placed away from trucks to avoid damage
- Bumper pads to protect the building

Waste Disposal, Composting, and Recycling

By incorporating waste disposal, composting, and recycling into facility design, the school can comply with applicable regulations, reduce food waste, and practice sustainability. Dumpsters are usually unsightly and, if possible, could be surrounded by brick, stone, or fencing that does not impede the waste hauler. A pressure washer can sanitize the dumpster area (Schweitzer, 2010). Receptacles for refuse and recyclables should be durable, cleanable, resistant to insects and rodents, leakproof, and non-absorbent. If kept outside, containers should have tight-fitting lids. Liners may be used inside the receptacles. These receptacles should be located away from food, equipment, utensils, and linens to avoid contamination (FDA, 2022). Pulpers are used with other waste solutions as they reduce the volume of solid food waste by grinding food waste with water into a slurry and then extracting most of the moisture to produce a dry pulp. Facility design and equipment considerations for installing a pulper include the following:

- Adequate space for the pulper along with space for school nutrition staff to access and maintain it
- An electrical connection that will support the power requirements of the pulper

- Plumbing that provides a water source for operation and a drain for the waste discharge, which should be installed following local codes and regulations
- Adequate ventilation for the type of pulper purchased

Composting is another method of fruit and vegetable waste disposal schools may implement. The amount of space and equipment needed to compost successfully depends on the size and scope of the composting program. For example, schools can use a low-cost worm bin for small amounts of fruit and vegetable waste. Or schools may use multiple bins on-site to compost larger quantities of food waste. The compost generated from worm and bin composting can be used in school gardens or landscaping. Food waste may also be sent to local farmers to feed animals. Commercial collection service of compost is also available for a fee. Schools contract with a company that picks up the food waste (and possibly other compostable items) to compost off-site (The Green Team, n.d.). Regardless of the method, composting will require pest control. School nutrition professionals can reach out to their local health department and extension office for more information and best practices. Composting equipment needs may include the following:

- A compost bin to hold the food scraps and other non-protein organic materials while they decompose, the size and amount of which will vary depending on the amount of waste generated
- Collection containers to collect the materials from the kitchen or cafeteria, which are typically made of plastic or metal with tight-fitting lids to contain odors
- A shredder to break down larger particles of food waste
- A thermometer to monitor the temperature of the compost pile
- A turning tool such as a pitchfork to mix the compost pile to speed up the composting process and ensure oxygen is distributed throughout the pile
- Gloves and safety gear to prevent injury and exposure to bacteria
- A scale to track the amount of food waste generated and monitor the success of the composting program

Recycling is central to sustainability, which many schools embrace as a value. School nutrition programs create much waste that can be recycled (e.g., cardboard boxes, plastic containers, steel and aluminum cans, glass jars). Facility design might include a space for sorting, cleaning, and storing recycling and appropriate equipment, such as can washers, can crushers, and trash compactors. The drawbacks of recycling include finding a recycling service provider, pest control, and making time in the schedule to complete recycling tasks.

Storage Areas

Depending on long-term growth projections of students and facility usage, the need for dry, refrigerated, and freezer space for storage may increase, which should be considered in the design phase. A separate area must be available for chemical storage. Storage of food items is prohibited in the following areas:

- Locker/dressing rooms
- Restrooms
- Garbage rooms
- Mechanical rooms
- Under sewer lines that are not shielded to intercept potential drips
- Under water lines that leak, including leaking automatic fire sprinkler heads or under lines on which water has condensed
- Under open stairwells
- Under other potential contamination sources (FDA, 2022)

When school nutrition professionals can easily access products, there is a reduced risk of injury from extended reaches, off-balance postures, and handling distances. Therefore, storage areas should be designed to improve access to materials. Aisles should be a minimum of 36 inches wide, with 42–48 inches wide preferred. Shelving should be adjustable, appropriate for the environment, such as shelving for dry storage or frozen storage, durable, and equipped with locking casters. To calculate the needed linear feet of shelving, use the formula provided by The Food Establishment Plan Review Manual (2016). Corner shelving makes the best use of space, and shelving depth should match the product size (The University of California Ergonomics Project Team, 2012). Shelving space should be adequate to separate foods, such as produce separated from thawing meat products or ethylene-producing fruits separated from ethylene-sensitive vegetables. Schweitzer (2010) indicates that shelves must be at least six inches off the floor, but suggests 10 inches for easy cleaning to decrease bending by school nutrition staff. Food must be stored six inches from the ceiling. Fire codes may vary, but a minimum of 24 inches from the ceiling to the top shelf is often required. Materials for dry storage environments may include polymer (plastic) and chrome-plated steel. Materials for refrigerated storage environments include polymer (plastic) and epoxy-coated steel. Over time, the epoxy coating may tear with use, and the exposed steel will be susceptible to rusting. Open wire shelving allows for air circulation and less dust accumulation.

Dry Storage. The amount of storage space needed for dry goods is calculated based on the number of meals served daily, delivery schedule, and storage area availability. The Conference for Food Protection (2016) offers calculators to determine storage area requirements. A dedicated space for dry storage should be accessible by an interior hallway, stairway, or elevator. Adequate shelving should be used to keep products off the floor and organized. Important dry storage reminders include the following:

- Locate the dry storage area close to the delivery/receiving area to prevent traffic through food preparation and production areas
- Locate the dry storage area so that it is visible from the school nutrition director's or manager's office to help deter theft
- Use wire rack shelving instead of solid shelving as it collects less dirt due to its smaller surface area
- Investigate dunnage platforms for storing large products
- Ensure adequate ventilation and humidity control as dry storage areas must maintain a temperature between 50 °F and 70 °F to prevent mold growth, rust on cans, and the caking and clumping of dry goods (Schweitzer, 2010)

Refrigerated Storage. Having enough refrigerated storage is a significant issue for most facilities. As refrigerated storage is added, consider locating walk-in refrigerators and freezers next to the delivery/receiving area in or near the kitchen with easy access to the food preparation areas, as the refrigeration and freezer storage should consider the food flow from receiving to the point of serving. The refrigeration and freezer space needed is based on the menu and expected food volume. Specifically, use the menu, type of kitchen operation, number of meals per day, and number of deliveries per week to determine the necessary refrigeration and freezer space. Also, school nutrition professionals should consider instances requiring more refrigerated storage, such as the Afterschool program or Farm to School program. The Conference for Food Protection (2016) guide offers formulas to estimate refrigerated storage space. Schweitzer (2010) suggests that schools producing and serving large volumes of food may have several refrigerator storage units maintained at different temperatures for the best possible quality of food storage.

Chemical Storage. All poisonous or toxic materials required for the foodservice facility's operation and maintenance must be stored away from food, equipment, utensils, and linens in a separate space exclusive to foodservice approved chemicals. The exception is that cleaners and sanitizers for dishwashing may be located in the dishwashing area, assuming they are stored to prevent contamination of food, equipment, utensils, and linens. The desired layout is a separate room for chemical storage and other cleaning supplies (e.g., mops, brooms, buckets) with a wall-mounted sink close to the dish room (Schweitzer, 2010). Non-foodservice chemicals should have a separate storage space outside the foodservice area.

Laundry. Soiled linens should be stored in a designated area away from the food production area. Receptacles for staff to place soiled uniforms, aprons, and other items can be in the locker room. Clean linens should be kept away from dirty linens, stored at least six inches off the floor, and protected from contamination. If a washer or dryer is used, it should be protected from contamination and placed where there is no exposed food, clean equipment, utensils, or linens. Dryers should be vented outside (FDA, 2022). If space is limited, consider a stackable washer and dryer combination (Schweitzer, 2010).

Food Preparation and Production

The food preparation and production areas require careful planning as they should be convenient to food storage, holding, and serving areas, be easy to clean and maintain, and provide a safe working environment. The overall design and equipment placement should also be flexible, as the menu and needs will change.

Equipment decisions must be made before finalizing these areas to ensure they have enough square footage. For example, if two ovens are located directly across from each other, there must be enough space so both oven doors can open at the same time. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHREA) (2018) recommends positioning the appliances so heavy-duty equipment is in the middle of the cook line and a side panel or end wall is used for heavy-duty appliances on the end.

Room for portable carts and racks next to workstations should be planned into the design. Aisle space (36 inches minimum for one person, 48 inches for two people) should accommodate the movement of carts and racks. Food preparation areas should have an open design if supervision is essential or if this space will be used for training or other classes.

Holding and Serving

The planning team should work with the foodservice consultant or vendor to design the layout of the food holding and serving area. There are various configurations and materials that can be customized to meet the service needs of the school nutrition program. The foodservice consultant, or industrial and engineering design team, depending on the scope of the project, will design the holding and serving area. Some manufacturers can provide industrial design and engineering input to guide the project from manufacturing to installation.

Other considerations include placing the holding area between the cooking and serving areas but not adjacent to the traffic flow in the serving line. School nutrition professionals should have enough space to load and unload food from the heated and refrigerated equipment. The serving areas should be adjacent to the kitchen and holding areas. Aisles should be a minimum of 36 inches wide to allow the flow of carts and employees from the holding area to the serving area. Adequate counterspace in the serving area should allow school nutrition professionals to replenish food from the holding equipment easily. The serving area should welcome the customer with easy navigation, minimal wait time, and pleasant interior design. The type of serving system will dictate traffic flow through and the set-up of the serving area.

Dining

The dining area needs to function as a place for students to eat and interact socially. Therefore, the design should be pleasing and incorporate different seating arrangements to accommodate various social and physical needs. There are many design factors to consider for the dining area: décor, lighting, acoustics, air quality, temperature, seating space and styles, room size, technology, and supervision. The dining area often includes a storage area for the tables and chairs when the site is being used for other purposes. A custodial closet may also be located near the dining area (Schweitzer, 2010).

Dining Room Tables. The standard table height is 29 inches, with 18-inch high benches or stools. For younger students, tables are available that are 27 inches high with 16-inch high seats. Consideration for materials are as follows:

- Most tabletops use particle board or plywood with a laminate top for easy cleaning. Particle board is lightweight and sturdy, but plywood is more robust and durable under heavy use.
- Table edges should not have sharp edges or corners and should have vinyl molding or spray-on epoxy to prevent damage and food build-up.
- The steel tube frames of tables range from 14–20 gauge: the lower the gauge, the stronger the steel.
- For easier lifting, tables may have safety features such as anti-tipping components, torsion bars, and springs. Steel latches function well for storage and maintaining in-use position.

School nutrition professionals have options when selecting the type of tables to purchase:

- Standard cafeteria tables may be rectangular, round, elliptical, or square, with or without seating. The attached seating style takes up less floor space than individual chairs but is not ideal for other cafeteria configurations (e.g., meeting, teaching space) due to comfort and fit.
- Mobile bench cafeteria tables are the traditional fold-up tables with bench seating.
- Mobile stool cafeteria tables have stools attached to traditional fold-up tables, which do not seat as many students as bench-style seating.
- Mobile cafeteria tables without attached seats work well if chairs need to be used for other purposes and when the number of seats needs to be flexible. Pull-up chairs also accommodate students of different shapes and sizes with different accessibility needs.
- Booth and cluster seating offers an alternative to traditional seating options but is not as mobile or convertible.

Dishwashing Area

The dishwashing area should be out of the preparation and cooking areas but conveniently located to return dishes and trays to the kitchen and serving areas. The dish return window should be near the dining room exit and be a minimum of 36 inches in width so that two students can use it simultaneously. If there is no dish return window, trays may be stacked on a table outside the dishwashing area, with a garbage can available to dispose of paper and food waste. The design of the dishwashing area must consider the following:

- Amount of on-site cooking
- Number of students served
- Number of dishes accumulated per hour
- Type of dishware used
- Pre-flushing and pre-scrapping process
- Type of dish system chosen
- Drying space
- Storage space

A stainless-steel sink with three compartments is required for manual cleaning and sanitizing unless the regulatory authority grants an exception for a two-compartment sink cleaning and sanitizing method. A three-compartment sink arrangement with a food scrap and disposal sink is ideal for removing organic matter before washing, rinsing, and sanitizing. The size and location of self-draining drain boards must be large enough to handle all equipment and utensils. Consider adding space for speed racks for additional air drying and an area for flatware sorting. All cleaned and sanitized utensils and equipment should be stored at least six inches above the floor to protect them from contamination.

Automated cleaning and sanitizing systems use high-temperature water and chemical sanitizers to clean and sanitize dishes, utensils, and equipment. School nutrition professionals should consider the following design and equipment parameters before purchasing a system:

- Adequate and dedicated space for use and maintenance
- Plumbing to both hot and cold water, along with a drain for wastewater that meets local codes and regulations
- An electrical connection that can support the power requirements
- Adequate ventilation, including an exhaust hood, as suggested by the manufacturer

Restroom and Locker Area

Per the requirements of the FDA (2022), the restroom and locker area should be located so that there is no access to it through the food production or utensil washing areas and it does not open directly into the food preparation area to avoid contamination. A locker room or dressing area with lockers should be provided if staff change clothes or if there is a need to store staff possessions. The FDA requires the facilities to include specific equipment and features, such as:

- The restroom should include a toilet, handwashing sink, cleanser, hand drying facility, toilet paper, waste receptacle, ventilation to the outside, a door, and at least 20-foot candles lighting.² At least one handwashing sink, toilet, and service sink are required, with more sinks and toilets needed per additional employee. Requirements vary by local code.
- Each handwashing sink should have hand soap and paper towel dispensers. Consider electronic eye or foot pedal controls to avoid cross contamination from on/off hand paddles. Timed faucets should run for at least 15 seconds with a temperature for handwashing at a minimum of 85 °F.
- Both paper towels and hand dryers should be used. However, using hand dryers without having paper towels available should be considered only if there is a method of exiting the restroom without contact with the door.

Office Area and Break Room

The office area may include the school manager's office, record storage area, inventory space, and computer area. The school nutrition manager's office should be a separate room situated to have the best view of the entire facility, and the design should incorporate materials that reduce the noise from the kitchen. The school nutrition director's office is typically larger as they have more administrative duties than the manager. For example, a conference table may be needed to interview potential employees, for departmental meetings, or to hold training sessions (Schweitzer, 2010). The director's office may or may not be on the same campus as the office of the school nutrition manager for that site.

Offices need access to the internet, phone lines, computers, printers, and other office equipment, along with desks and filing space. While many school nutrition operations utilize electronic records, there are often still paper records that must be securely kept. The school nutrition director should keep all documents according to State agency requirements. The school nutrition manager should have a safe area to store daily records such as production records, invoices, and payroll records. These records are often kept in each school before being consolidated at the Central Office. A small safe may hold the daily bank deposit.

The design of the space should consider staff needs. An ideal break room design allows for a space where employees can get away from the kitchen to relax and eat. Comfortable furnishings, adequate heating, air conditioning, windows, covered waste receptacles, and a bulletin board for posting announcements would be included in this space (Schweitzer, 2010). Additionally, adequate space, such as lockers, should be provided for staff to store their personal belongings.

² Lighting is measured in food candles. One foot-candle equals one lumen per square foot. For more information, please see the section on lighting in this chapter.

Other Design Considerations

Surfaces

Sanitation standards are regulated by Federal, State, and local municipalities and are essential to the safety of the nutrition program. Materials used to construct surfaces that come into contact with food should have the following characteristics to promote sanitation and decrease cleaning time (FDA, 2022):

- Safe³
- Durable
- Resistant to corrosion
- Non-absorbent
- Weight and thickness should endure repeated washing
- Smooth, easily cleanable finish
- Resistant to damage (e.g., chipping, pitting, scoring, scratching)
- Free of imperfections (e.g., breaks, cracks, open seams)
- Designed without sharp internal angles, corners, and crevices
- Finished with smooth welds and joints

Flooring, Walls, and Ceilings

The Conference for Food Protection (2016) manual and the FDA Food Code (2022) dictate the design of the flooring, walls, and ceilings, which should be smooth, durable, and easy to clean. In food production, refrigeration, dishwashing, restroom, and locker room areas, non-absorbent flooring is recommended, and carpeting is prohibited. Quarry tile, ceramic, and galvanized flooring are not recommended for walk-in cooler or freezer units but may be used elsewhere.

Other places where moisture, flushing, or spray cleaning methods are used should also not be carpeted. Mats should be removable with the ability to be cleaned. If floors are cleaned with water flush methods, they should have drains and be sloped to drain, and the floor and wall junctures must be sealed. Floor and wall junctures should be closed to no larger than one millimeter (one thirty-second inch).

Carpeting should be closely woven and easy to clean when used in areas such as the staff dining room. The carpet should be securely attached to the floor and installed tightly against the wall. Alternatively, the carpet may be installed away from the wall with the space and edges of

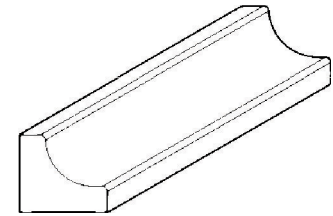
³ Per the FDA Food Code (2022), safe materials are defined as:

“(1) An article manufactured from or composed of materials that may not reasonably be expected to result, directly or indirectly, in their becoming a component or otherwise affecting the characteristics of any FOOD; (2) An additive that is used as specified in § 409 of the Federal Food, Drug, and Cosmetic Act; or (3) Other materials that are not ADDITIVES and that are used in conformity with applicable regulations of the Food and Drug Administration.” (p. 19)

the carpet fastened by metal stripping or other means.

Coving, a molding placed at the junction between walls and the floor, is required in most areas. However, coving is not required in areas used exclusively for dining, point-of-sale, or food storage. The Conference for Food Protection (2016) includes details on different types of coving.

Except for areas used for dry storage, all indoor wall construction materials (e.g., concrete, porous block, stainless steel, epoxy or glazed drywall, brick) should be finished and sealed for a smooth, non-absorbent, easily cleanable surface. In addition, anything attached to the walls or ceilings, such as light fixtures, fans, or decorative items, should be easily cleanable.



Cove molding

Ceilings should be sound absorbent while meeting other regulatory requirements (e.g., smooth, durable, easy to clean). Non-absorbent ceiling tiles, painted drywall, or approved wall finish materials may be used. An acoustical consultant may be hired to evaluate how to design and equip spaces with the appropriate materials to achieve the desired acoustic qualities and minimize noise levels.

Lighting

Light fixtures in food production, storage, and sanitizing areas should have protective lenses, light tubes with end caps, or safety-coated bulbs. Light bulbs should be shatter-resistant where exposed to food, clean equipment, utensils, and linens (FDA, 2022).

For areas of infrequent use (e.g., closets, storage rooms, restrooms), use occupancy sensors or timers on lights for energy savings (ASHREA, 2018). Consider the use of natural lighting where available. Minimum lighting requirements for main areas are found in Table 8.

Table 8

Minimum Lighting Requirements

Space	Minimum Lighting (foot candles) ^a
Walk-in refrigeration	10 ^b
Dry food storage	10 ^b
Self-service areas (e.g., buffets, salad bars)	20
Inside equipment (e.g., reach-in and under-counter refrigerators)	20
Stations for handwashing, dishwashing, restrooms, and in equipment and utensil storage	20 ^b
The surface where staff is working with food or with utensils or equipment where safety is a factor (e.g., knives, slicers, grinders)	50

Note. Lighting requirements are set by the FDA Food Code (2022).

^a Lighting is measured in foot candles. One foot-candle equals one lumen per square foot.

^b At a distance of at least 30 inches (75 centimeters) above the floor.

Windows and Doors

Windows should be closed and tight-fitting. If opened, then windows should be covered by 16 mesh to one-inch screens to stop insects and rodents (FDA, 2022). The ASHRAE (2018) recommends the following door configurations:

- Equip all doors with automatic door closers with hydraulics for securing the door against the gasket.
- Latching walk-in box doors should have a door switch that senses when a door is open, switches off the refrigerant flow to the coil, and stops the evaporator fan. If the door is left open for an extended time, a safety device should turn the refrigerant flow and evaporator fan back on to avoid product loss.
- Use double-action swinging doors for high-traffic areas (e.g., produce prep areas).
- Install door alarms with visual (e.g., light) and audible (e.g., horn) features to alert staff to doors that have not been completely shut.
- Install a hard-wired air curtain (e.g., fly fan) on the kitchen exterior door. Plug-in models may be turned off by staff.

In addition, doorways used for deliveries should be at least 42 inches wide with metal kick plates on each side to protect the door from damage. Center metal posts should not be used or should be easily removable (Schweitzer, 2010).

Energy Sources and Conservation

When schools improve the energy efficiency of their buildings, there are several benefits. Greenhouse gas emissions are reduced with decreased use of fossil fuels. When schools purchase energy-efficient equipment, such as an ENERGY STAR® dishwasher, energy costs, water utility bills, and the amount of used water entering the wastewater system decreases.

Students directly benefit from energy-efficient strategies. School buildings are often designed to use natural light to offset energy costs. Research indicates that natural light has a positive impact on student performance. Another potential benefit of energy-efficient building design is improved acoustics, which has also been shown to improve student performance. If the energy efficiency strategies include better ventilation systems, indoor air quality is improved. Students in energy-efficient buildings may have the opportunity to learn about energy and environmental issues through a curriculum that incorporates experiential activities such as evaluating their school's energy consumption. Finally, school security and safety may be improved due to designs focusing on natural lighting and increasing surveillance capabilities (EPA, 2011).

An audit can document the facility's current energy use and identify ways to increase energy efficiency during a renovation. The National Renewable Energy Laboratory (2013) identifies three levels of audits. A walk-through analysis (ASHRAE Level 1) involves the planning team studying utility bills and visually surveying the facility. This type of audit is not recommended for making financial decisions. A targeted audit (ASHRAE Level II) identifies energy efficiency improvements in specific areas requiring in-depth engineering analysis and more capital. If performed by a

specialty equipment vendor, the results may be biased, or other non-targeted areas may be missed. Performed by a qualified energy auditor, an investment-grade audit (ASHRAE Level III) analyzes the interactive outcomes of the improvements across all systems. It provides estimated costs and savings and a detailed implementation plan, which can be relied on for decision-making. The fee for the energy audit may be partly covered by rebates from State and local incentive programs.

For either new construction or renovations, the planning team needs to consider the energy impact of all cooking activity components in selecting a fuel source and related equipment (ASHRAE, 2018). This decision requires thoughtful research and planning as it is costly to change energy sources later.

ASHRAE (2018) recommends ENERGY STAR® equipment as a minimum standard in the eight categories of commercial kitchen equipment: commercial hot food holding cabinets, solid and glass door refrigerators and freezers, fryers, steam cookers, ice machines, ovens (convection and combination ovens), griddles, and dishwashers. Using ENERGY STAR® equipment will reduce energy costs and annual carbon dioxide (CO₂) production. For example, replacing ten conventional commercial dishwashers in a district with ENERGY STAR® products can save \$8,690 annually (including water savings) and reduce CO₂ production by 57 tons (EPA, 2011). Outside of these eight categories, ASHRAE (2018) suggests using the American Society for Testing and Materials (ASTM) International standard performance test methods to evaluate the capacity, cooking performance, and energy efficiency of other categories of kitchen equipment.

Another energy conservation strategy is to ensure temperatures are set appropriately and thermostats are working. For example, the minimum temperatures of storage water heaters should be 135 °F and 140 °F for dishwashing machines to avoid microbiological growth (ASHRAE, 2018).

Plumbing Considerations

The water source should be safe and provide enough water (including hot water at the appropriate temperature) to operate the facility. For example, hot water for handwashing must be a minimum of 85 °F (FDA, 2022). For help calculating hot water requirements, the planning team can use the Food Establishment Plan Review Manual from the Conference for Food Protection (2016). Drain water also has temperature requirements as the plumbing code dictates that it be less than 140 °F (The International Association of Plumbing and Mechanical Officials, 2018).

Plumbing should be located so that the kitchen can grow without needing extensive renovation or additions to the plumbing. Air gaps or other approved plumbing devices between potable water and a drain are necessary to prevent accidental backflow. Drains should be located where water might need to be drained (e.g., in front of tilt skillets or kettles, refrigerators, restrooms, dish rooms).

Ventilation Considerations

Heating, ventilation, and air conditioning systems should be planned and installed so that intake and exhaust vents do not cause contamination of food or surfaces that come into contact with food, equipment, or utensils (FDA, 2022). Hoods must be used with any equipment that produces smoke, steam, grease, mist, vapors, fumes, odors, or condensation (Conference for Food Protection, 2016). The ASHRAE (2018) recommends the following:

- Selecting exhaust hood styles and designs that decrease exhaust
- Installing separate exhaust fans for appliance hoods if used during different times of the day (e.g., serving line cooking stations with exhaust hoods may only operate for two hours per day during serving while the main production kitchen hood may operate for four to five hours per day)
- Designing exhaust ventilation systems to minimize total airflow while maintaining adequate exhaust flow

The DOE (2015) recommends variable-speed exhaust hood flow systems, also known as Demand Control Kitchen Ventilation (DCKV) systems, which save energy due to decreased fan speeds. These systems save energy and costs by adjusting the quantity of kitchen hood exhaust and incoming outdoor air. DCKV is the best investment for kitchens with exhaust flow rates of 5,000 cubic feet per minute (CFM), longer hours of operation, and high amounts of air treatment (including temperature and humidity).

Codes and Regulations

The planning team should check applicable city, county, State, and Federal codes as they may change over time. All prepared plans and specifications for review and approval must be submitted to the appropriate authorities before any new construction or renovation. According to the Conference for Food Protection (2016) and the FDA Food Code (2022), the plan should include the following:

- Intended cycle menu
- Estimated volume of food that will be stored, prepared, and served
- Proposed layout, mechanical schematics, and construction plans, including all required sinks, lighting fixture locations, auxiliary areas (e.g., storage rooms, garbage rooms, restrooms), entrances, exits, loading/unloading areas, and delivery docks
- Flow patterns for food, utensils, and garbage
- Proposed equipment, including names of manufacturers, model numbers, locations, dimensions, and working and installation specifications
- Complete finish schedules for each area, including floors, walls, ceilings, and coved juncture bases
- Plumbing schedule, including the location of all related plumbing fixtures and equipment (e.g., floor drains, sinks, water supply lines) and source of water and method of sewage disposal
- Storage of staff personal items
- Ventilation
- A draft or developed standard procedures that reflect compliance with the FDA Food Code (2022)
- A HACCP plan
- Other information as required or requested

Other applications and fees are typically submitted at various time points. Inspections must be conducted and permits issued before the facility may operate.



Chapter Five

Making Specific Equipment Choices

CHAPTER FIVE OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- How to develop an equipment replacement schedule
- How the cycle menu and the production method determine equipment selection
- How to budget large equipment expenditures by calculating the total cost of ownership
- The process of identifying equipment size and capacity needs
- Equipment characteristics and how they relate to performance and materials
- How sustainability informs equipment purchases
- Safety standards related to equipment, including certifying organizations
- Types of warranties and what they typically cover

School nutrition professionals understand the primary importance of the menu and the type of food items produced when making equipment selections. During the planning process, the Program Profile (see Chapter Three) is completed, and the equipment selection begins with the following:

- Establishing the reason for the equipment purchase (new facility, renovation, or replacement)
- Identifying the type of food production and products to be prepared and served
- Considering potential future cycle menu changes and production demands
- Calculating budgets
- Making specific equipment procurement choices

The planning team makes specific equipment selections based on the cycle menu, the total cost of ownership (TCO), capacity, efficiency, performance, materials, sustainability, food and worker safety standards, and warranties and extended warranties.

Replacement planning and budgeting are part of a long-range strategic plan. Over time, equipment replacement may be necessary because the unit requires a high level of maintenance to operate, it has become obsolete, it is at the end of its lifespan, the use is under or over capacity, or there is a need for more automation. Therefore, school nutrition programs should allocate approximately two percent of gross revenue toward equipment replacement. Consider three factors when developing a replacement planning schedule:

- The expected life of the equipment
- The expected repair costs
- Maintenance costs

Cycle Menus and Productions

The cycle menu and type of food products to be prepared and served are two of the most significant determining factors of what equipment will be purchased. The cycle menu determines the type, variety, and frequency of food products served and improves employee familiarity with the menu, operational proficiency, and efficiency. The cycle menu will dictate the type of equipment you should purchase. For example, convenience operations may utilize primarily convection ovens to heat and serve foods prepared by manufacturers. In contrast, a scratch cooking environment may need additional large equipment such as tilt skillets, steam jacketed kettles, mixers, and immersion blenders to prepare foods using various ingredients. Manufactured or processed food products designed to reduce labor requirements and provide consistency are widely available. School nutrition professionals should determine how much food production will be outsourced to companies providing these products before budgeting for large equipment expenditures that may be under-utilized. For example, facilities purchasing precooked, ready-to-heat foods may not fully utilize a tilt skillet during food production. Available staffing, skill level, and a desire for on-site food production should be considered before outsourcing food production to manufacturers, as well as the overall benefits of on-site food production. The many benefits of on-site food production and central kitchens include:

- Better quality of the finished product
- Fresher products
- Support of local food systems through procurement
- More skilled staff who can work in a variety of food service operations
- Greater staff buy-in
- More control over menus and the ability to modify the menu when processed food product shortages occur

Cost and Total Cost of Ownership

School nutrition professionals must be fiscally responsible with program funds. Equipment purchases are typically major budget expenditures. However, selecting less expensive equipment may not be the best option for long-term use. Lower-priced equipment may not have the same level of quality, durability, and reliability as more expensive options. Therefore, it may be more prone to breakdowns, malfunctions, or wear and tear, which can cause operational disruptions, delays, and increased maintenance costs. These factors will add up over time, resulting in a higher cost for the equipment in the long term. More expensive equipment may offer features and capabilities that less expensive equipment does not, such as better energy efficiency, faster cooking times, or better product quality outcomes. These positive outcomes can help the nutrition program operate more efficiently, resulting in cost savings over time. Alternatively, a higher price does not always indicate superior performance.

Before equipment replacement, the school nutrition professional should consider if the menu could be simplified to eliminate the need for the unit or if the menu item could be prepared with equal or better quality using another type of equipment. For example, a steamer may not need to be replaced if the nutrition program recently invested in a combi-oven that could function as an oven, steamer, or both (combi-mode), depending on the production needs.

The true cost of a piece of equipment goes beyond the initial purchase price, rebates/incentives, and setup/installation price. Variable costs to consider include:

- Warranty and extended warranty
- Utilities
- Parts and repair
- Recommended preventive maintenance
- Any required proprietary chemicals
- Anticipated useful lifetime
- Consumables (e.g., water filters, cleaning supplies, batteries)
- Labor to operate
- Equipment disposal

In evaluating warranties, school nutrition professionals should determine who is authorized to repair the equipment. In addition, school nutrition professionals should ask the manufacturer if in-house maintenance may be trained in equipment maintenance and repair without voiding the warranty.

It is challenging to obtain the true cost of all variables to calculate the cost of purchasing, installing, and utilizing a piece of equipment over its useful lifetime. The North American Association of Food Equipment Manufacturers (NAFEM) developed the [Life Cycle/Total Cost of Ownership Tools](#) (n.d.) to aid buyers in conducting a life cycle cost analysis when comparing products during procurement or deciding when to replace a piece of equipment. Steering

committee members representing manufacturers, end-users, dealers, representatives, consultants, and service agents provided the framework. To determine a piece of equipment's TCO, school nutrition professionals may download spreadsheets (full and condensed versions) and fill in the data to calculate costs and make more informed purchasing decisions. School nutrition professionals benefit from making these data-driven decisions to maximize budgets, resourcefully use program funds, and support long-term equipment cost control.

Size and Capacity

Equipment size and capacity should be carefully considered. Manufacturers' estimates are only a guide. The space required for equipment installation and operation should include all size dimensions (length, width, and height) and any space recommendations for ventilation and cleaning. The size of the entryway for equipment installation should be measured to ensure no potential issues will arise during delivery.

The school nutrition program needs to consider volume requirements, ability to batch cook, and speed of service in selecting the right equipment for quality and quantity food production. The amount produced should meet the number of meals served in a given time period. In addition, food quality and safety depend on the ability to batch cook foods in a timely manner. Use the following as a step-by-step guide to identify food production equipment needs.

1. Create the cycle menu and identify the recommended equipment to prepare the food items. To determine capacity/volume needs based on the number of servings planned, review previous food production records or, if new construction, forecast using production records of similar operations.
2. Identify the cook time and temperature for each item that will be prepared using the piece of equipment and whether the items may need to be cooked concurrently (cooking times of 30 minutes or more for chicken tikka masala versus 15 minutes or less for bakeable French fries).
3. Determine the batch cook times based on the meal service schedule, the number of servings needed, and the required number of portions per pan (e.g., eight flatbread pizzas per full-size sheet pan) to produce planned servings.
4. Determine equipment capacity: How many pans can the identified piece of equipment hold?
5. Evaluate equipment needs based on cook time, batch cooking times, servings needed, and equipment capacity, including holding equipment.

Step-By-Step Guide Example

- Select the menu and equipment to be used:
 - Chicken legs (raw product) for baked, sweet Thai chicken legs
 - Whole grain roll
 - Wedge pizza slice
 - Equipment: Two convection ovens (double stack = 4 ovens)
- Identify the number of servings planned, the temperature, and the cook time:

Servings Planned	Temperature	Cook Time
350 legs (175 servings)	400 °F for the first 10 minutes Finish at 350 °F for 30 minutes	40 minutes
350 whole grain rolls	350 °F	12–15 minutes
384 pizza wedges	400 °F	17–20 minutes

- Determine the batch cook times, the number of portions needed, and the required number of pans to produce desired servings (i.e., rolls 35 per sheet pan; chicken legs 35 per sheet pan; pizza wedges 12 per sheet pan):

Batch Cook Times	Menu Item	Portions Needed	Full-size Sheet Pans
9:30 am–9:45 am	Hot rolls*	350	10 each
10:00 am–10:40 am	Sweet Thai chicken legs	175	5 each
10:45 am–11:00 am	Wedge pizza slices	96	8 each
11:00 am–11:15 am	Wedge pizza slices	48	4 each
11:15 am–11:35 am	Sweet Thai chicken legs	175	5 each
11:30 am–11:45 am	Wedge pizza slices	48	4 each
12:00 pm–12:15 pm	Wedge pizza slices	96	8 each
12:30 pm–12:45 pm	Wedge pizza slices	96	8 each

*Hot rolls maintain quality during longer holding times. Therefore, all may be cooked in advance and held in a food warmer.

- Determine equipment capacity: How many pans can the identified piece of equipment hold? In this example, each full-size convection oven holds five sheet pans. Some food items may require cooking space within the oven cavity (i.e., only three to four racks for whole grain rolls that need to rise). One full-size hot holding cabinet can hold 10 sheet pans of cooked rolls. An additional warmer may be necessary if pass-through heated cabinets have limited space.
- Evaluate equipment needs based on cook time, batch cooking times, servings needed, and equipment capacity, including holding equipment.

Batch Cook Times	Menu Item	Portions Needed	Oven 1	Oven 2	Oven 3	Oven 4
9:30 am – 9:45 am	Hot rolls	350	3 pans	3 pans	3 pans	1 pan
10:00 am–10:40 am	Sweet Thai chicken legs	175			3 pans	2 pans
10:45 am–11:00 am	Wedge pizza slices	96	4 pans	4 pans		
11:00 am–11:15 am	Wedge pizza slices	48	4 pans			
11:00 am–11:40 am	Sweet Thai chicken legs	175			3 pans	2 pans
11:30 am–11:45 am	Wedge pizza slices	48	2 pans	2 pans	Turn oven off at 11:40 am	Turn oven off at 11:40 am
12:00 pm–12:15 pm	Wedge pizza slices	96	4 pans	4 pans		
12:30 pm–12:45 pm	Wedge pizza slices*	96	4 pans (turn oven off at 12:45 pm)	4 pans (turn oven off at 12:45 pm)		

*Adjust batch cook item(s) forecast at the end of service times, where necessary.

Helpful Tips

- Consider holding time for cooked menu items (e.g., lasagna, enchilada bake). Items that can be held without declining in quality can be prepared in advance, freeing up oven space for faster batch cook items.
- Consider revising the menu mix in terms of production if needed (i.e., the kitchen cannot afford/accommodate two tilt skillet for chili and stir fry on the same day, but the menu can be changed to put these items on different days).
- Consider whether the operation will be preparing items in advance, safely cooling, and serving at a later time that week (e.g., chili prepared a day in advance, cooled, reheated).

Performance

Proper equipment and ideal performance are best determined by evaluating the equipment during operation. Does the slicer make a clean cut? Are pieces uniform? Do the wheels move easily when the cart is carrying approved weights? Where possible, visit the manufacturer's test kitchen or display facility or consider a field trial of the equipment if offered by the manufacturer. Ask the manufacturer for a production video showing actual food production using the unit. For smaller equipment, a unit may be requested to test performance, ease of use, cleaning, and sanitizing in the school nutrition kitchen. A director may visit a neighboring school district that owns the piece of equipment to test it out. Alternatively, a director could purchase a single unit to evaluate the equipment.

Materials

Approved materials should be smooth, non-toxic, non-porous, non-absorbent, corrosion-resistant, durable, and cleanable. The types of materials recognized as safe and meet the definitions and requirements in the [Federal Food, Drug, and Cosmetic Act](#) (Federal Food, Drug, and Cosmetic Act, 1938) for use in the commercial kitchen environment vary. Stainless steel, aluminum, and reusable plastic (cleaned and sanitized) are common substances selected for use in commercial kitchen operations due to their ability to meet Federal code requirements. Since 1918, the [American National Standards Institute](#) (ANSI) has maintained national, public health food equipment and environment standards. ANSI does not develop the standards but provides a venue for private and public sector experts and stakeholders to collaborate to create the standards. ANSI accredits the procedures of standards developing organizations (SDOs) and approves their documents as American National Standards (ANS). ANSI maintains standards through this accreditation and oversight to ensure all parties have the opportunity to participate in a standard's development (ANSI, n.d.).

Stainless Steel

Stainless steel is the most commonly chosen surface for food processing and production equipment. However, this type of steel is not a singular product. There are over 50 stainless steel alloys (i.e., metallic substances comprised of two or more elements) and more than 150 grades or types of metal engineered to provide good corrosion and heat resistance with varying load strengths. Surface treatments will enhance these properties. The American Iron and Steel Institute (AISI) originally developed the grading system, which is now maintained by the ASTM International, formerly known as American Society for Testing and Materials American Society of Testing and Materials (ASTM, n.d.).

Galvanized steel is coated in zinc, which resists corrosion but does not have the food safety characteristics of stainless steel. This material may be found in the food environment, in such equipment as hoods, shelving, and non-food contact surfaces.

There are two general categories of stainless steel, non-magnetic and magnetic. A common type of stainless steel used for food production equipment is non-magnetic AISI 300 series Type 304, also known as 18/8, due to the added 18 percent chromium and 8 percent nickel. Another common stainless steel for food equipment is AISI 300 series Type 316, which is more corrosion-resistant (Schmidt et al., 2012). Table 9 lists general non-magnetic stainless steel classifications based on alloy, common AISI grades, product characteristics, and the applications related to foodservice.

Table 9

Non-magnetic Stainless Steel Alloys and Their Foodservice Applications

Alloy	Common AISI Grades	Characteristics	Foodservice Applications
Austenitic alloy (chromium-nickel-manganese)	100 & 200 Series Type 101, 102, 201	<ul style="list-style-type: none"> • Low strength • Low durability • Corrosion resistance 	Generally not recommended for foodservice, but 200 series, Type 201 may be found in less expensive equipment
Austenitic alloy (chromium-nickel)	300 Series Type 301, 302, 303	<ul style="list-style-type: none"> • Higher strength than the 100 and 200 series • Low corrosion resistance 	Low corrosion limits and used in the food production environment
Austenitic alloy (chromium-nickel)	300 Series Type 304	<ul style="list-style-type: none"> • More corrosion resistant than types 301–303 • Less strength than 303 	Most commonly used steel in food production facilities and equipment
Austenitic alloy (chromium-nickel-molybdenum)	300 Series Type 316	<ul style="list-style-type: none"> • More corrosion resistant than 304 	The second most commonly used steel in food production facilities and equipment

Magnetic stainless steel is commonly used for foodservice utensils and in other industries, including car manufacturing and surgical instruments, where high strength and wear resistance are preferred. Table 10 lists general magnetic stainless steel classifications based on alloy, common AISI grades, product characteristics, and the applications related to foodservice.

Table 10

General Magnetic Stainless Steel Classifications

Alloy	Common AISI Grades	Characteristics	Foodservice Applications
Ferritic: chromium and iron alloys	400 Series Types 405, 409, 430, 439, 446	<ul style="list-style-type: none"> • High heat resistance • Poor corrosion resistance 	Not recommended as a food contact surface, but the 400 series may be used for carts, appliance trim, panels, etc.
Martensitic: chromium, iron, and carbon alloys	400 Series Types 410, 416, 420, 431, 440	<ul style="list-style-type: none"> • High strength • Wear resistant 	Utensils, cutlery ^a

^a If using a magnetic retriever for serving utensils, the product should meet the general magnetic stainless steel classifications.

Stainless steel is graded by the thickness of the sheet. The larger the number, the thinner the metal. For example, 18-gauge steel will be a thinner, lower strength product than the same series and type of 16-gauge. The most durable, stainless steel may be susceptible to corrosion (discoloring and pitting) over time from acidic foods and chemicals (e.g., high chlorine concentrations). Foodservice equipment may contain multiple gauges in one unit. For example, a walk-in cooler may have a 24-gauge galvanized steel door or stainless steel door, with 16 to 20-gauge walls and ceilings, a 16-gauge galvanized stainless steel floor, and an aluminum kickplate. Table 11 lists the gauge number, fraction, gauge decimal, and load weight in pounds per square foot (lb/ft²) of stainless steel commonly used in foodservice applications.

Table 11**Characteristics of Stainless Steel Used in Foodservice**

Metal Gauge No.	Fraction (inches)	Gauge Decimal (inches)	Weight (lb/foot²)	Examples
24	1/40	0.0250	0.756	Colander, cookware, steam table pans (very light duty, edges may bend when dropped)
22	1/32	0.0312	1.260	Cookware, sheet pans, steam table pans, equipment side panels
20	3/80	.0.375	1.512	Sheet pans, utility carts
18	1/20	0.0500	2.016	Dishers, sheet pans, sinks, utility carts, worktable tops (very light duty; dents easily), under shelves of worktables
16	1/16	0.0625	2.520	Worktable tops (mid-range lighter duty), sinks, utility carts
14	5/64	0.0781	3.150	Equipment stands, worktable tops (heavier duty), serving line tops and tray slides, sinks

Aluminum

Food-grade aluminum is the second most commonly used metal in foodservice. Finishes are available that have the look and feel of stainless steel. It is less expensive and has a higher heat conductivity than stainless steel but is not as durable. Aluminum is more susceptible than stainless steel to corrosion (discoloring and pitting) over time from acidic foods and chemicals. Manufacturers may opt for a protective coating called anodizing, which thickens and strengthens the metal. Aluminum may be tempered or heat-treated to improve hardness and strength. Aluminum is iron-free and cannot be used with induction cooking equipment.

Aluminum is iron-free and cannot be used with induction cooking equipment.

Table 12 lists the common aluminum alloys, characteristics, and foodservice applications.

Table 12**Common Alloys and Their Foodservice Applications**

Alloy	Characteristics	Foodservice Applications
1100 99% aluminum with a 1% mix of other metals	<ul style="list-style-type: none"> • Softest alloy • Rust resistant • Warps with heat application • Prone to easy dents and scratches • Corrosion from acidic foods over time 	Disposables such as cans, foil, packaging
3003 Aluminum with 1–1.5% manganese (adds strength) and other metals	<ul style="list-style-type: none"> • Medium softness • More durable for medium-duty applications • More corrosion resistant 	Cookware
3004 Aluminum with 1–1.5% manganese and 1% magnesium	<ul style="list-style-type: none"> • Least soft alloy • Less prone to corrosion and pitting 	Cookware
6063 Aluminum with .45 to .9% magnesium and .4% silicone	<ul style="list-style-type: none"> • Strong alloy • Less prone to corrosion and pitting 	Shelving Pan racks

Like stainless steel, aluminum is available in varying thicknesses. Be mindful of thinner gauges used in some bakeware, such as 19 and 20. While less costly, these products may warp and deteriorate quickly over time. Table 13 lists the standard aluminum gauge numbers, fractions, gauge decimals, and load weights in pounds per square foot (lb/ft²) used in foodservice.

Table 13**Characteristics of Aluminum Used in Foodservice**

Metal Gauge No.	Fraction (inches)	Gauge Decimal (inches)	Weight (lb/foot²)	Examples
20	1/31	0.032	0.452	Sheet pans
18	1/25	0.040	0.569	Sheet pan racks, pizza pans
16	3/59	0.051	0.717	Bun pans, colanders and sheet pans
14	5/78	0.064	0.905	Bun pans, pizza pans, sheet pans
12	8/99	0.081	1.140	Mobile equipment stands, roasting pans, sauce pans, wall shelves
8	9/70	0.129	1.813	Colanders, stock pots
6	6/37	0.162	2.286	Sauce pans, stock pots

Plastics

Plastics safe for reuse are non-porous and must be cleaned and sanitized before use. These plastics are widely used in foodservice operations as food storage containers and food production and serving equipment such as pans, trays, and lids. Single-use plastics, such as food packaging containers, are porous and may not be cleaned and sanitized without the risk of harboring potential food pathogens. Using leftover mayonnaise or other food packaging items to store food is an FDA non-critical violation and is prohibited. Plastics safe for reuse are smooth, easy to clean, and without sharp edges or threads that could harbor potential pathogens.

Non-food contact composite and molded plastics may be used in foodservice operations for structural components for carts, hot and cold transport equipment, and shelving. Composites are plastics reinforced for strength with human-made or natural fibers such as carbon or fiberglass. Shelving uses a composite plastic to be able to withstand a heavier load. Some heavy-duty carts may be composites. School nutrition directors should identify the necessary weight capacity for this equipment. Molded plastic is made by pouring liquid plastic into a container or mold to harden it into a desired shape. Molded plastic in various colors is used in hot and cold transport equipment.

Sustainability

Sustainable practices, such as energy and water conservation, are another way to be fiscally responsible and conserve environmental resources when purchasing equipment. The following organizations set sustainability standards and offer resources.

ENERGY STAR® equipment meets energy efficiency standards set forth by the EPA in conjunction with the DOE (EPA, n.d.-d). All tested and certified equipment approved by ENERGY STAR® display the mark below:








Fee-based certifying organizations include the Canadian Standards Group (CSA), Edison Testing Laboratories (ETL), National Sanitation Foundation (NSF), and Underwriters Laboratories (UL). The Food Service Technology Center (FSTC) in California conducts independent energy efficiency testing on foodservice equipment in their International Organization for Standardization (ISO) accredited lab. Their operation has expanded to provide kitchen energy consultations and evaluations, education and training, and a demo lab where potential buyers can try out the equipment before they invest. This organization is supported by service fees and the Pacific Gas and Electric Company. School nutrition professionals interested in learning more about energy efficiency may take the online, fee-based course developed and offered by California's Frontier Energy Food Service Technology Center (n.d.).

Equipment Safety Standards

Equipment safety standards assure school nutrition professionals a safe working and food production environment. The Occupational Safety and Health Administration (OSHA) requires equipment to be inspected and certified for safety by an independent third party. The OSHA Nationally Recognized Testing Laboratory (NRTL) Program identifies independent, private-sector organizations to provide third-party evaluation, testing, and certification based on established product safety standards. The OSHA NRTL certification ensures that the product meets the requirements of the construction and general industry OSHA electrical and gas standards. Manufacturers contract with these organizations to inspect and rigorously test equipment to determine if it meets the established criteria for health and safety before applying the approval seal. Table 14 lists commonly recognized NRTL organizations for equipment safety certification, and all NRTL organizations are on the OSHA website (n.d.)

Table 14**Equipment Safety Organizations**

Certifying Organization	Mark	Certification Name	Services	Website
CSA Group		Electrical and plumbing	The certification confirms that the OSHA electrical and plumbing standards are met.	https://www.csagroup.org/
CSA Group		Gas	The certification confirms that the OSHA gas standards are met.	https://www.csagroup.org/
Edison Testing Laboratories: a division of Intertek		Electrical and gas	The certification confirms that the OSHA electrical and gas standards are met.	https://www.intertek.com/
Edison Testing Laboratories: a division of Intertek		Sanitation	The certification confirms that the National Sanitation Foundation and American National Standards Institute (ANSI) sanitation standards are met.	https://www.intertek.com/marks/etl-sanitation/
National Sanitation Foundation International		Sanitation	The certification confirms that food equipment has been tested and complies with the FDA requirements for sanitation and OSHA.	https://www.nsf.org/






Certifying Organization	Mark	Certification Name	Services	Website
Underwriters Laboratory Solutions		Gas and electrical	The certification confirms that the OSHA gas and electrical safety standards are met. The certification is available for firefighting equipment, including sprinkler and hood systems.	https://www.ul.com/
Underwriters Laboratory Solutions: EPH		Sanitation	The certification confirms that NSF sanitation standards are met.	https://www.ul.com/services/foodservice-equipment-sanitation-certification

Table 15 lists other organizations providing equipment safety or sanitation certifications.

Table 15

Equipment Safety and Sanitation Certifying Organizations

Certifying Organization	Mark	Certification Name	Description of Services	Website
Air Conditioning, Heating, and Refrigeration Institute		Refrigeration and Ventilation	This organization certifies that commercial refrigeration and kitchen ventilation equipment complies with all published claims.	https://www.ahrinet.org/
Federal Communications Commission		Induction and microwaves	This organization certifies microwave ovens and induction cooking equipment that operates at safe radio wave frequencies.	https://www.fcc.gov/
Plumbing and Drainage Institute		Plumbing	This organization certifies drains, backwater valves, and other plumbing equipment meet established safety standards.	http://www.pdionline.org/

School nutrition professionals should ensure that all equipment purchased for use in school nutrition programs meets the required standards. For example, home or residential equipment that has not been tested and certified as safe for commercial use may not be used. Conformité Européenne (CE) is a European Union certification that does not comply with the U.S. National Electrical Code (NEC). Equipment stamped with only the CE mark should not be used in U.S. school nutrition programs.

Warranties and Extended Warranties

A warranty is a legally binding commitment included in the sales contract that assures the buyer that the equipment is free from defects. An extended warranty costs extra, may cover different aspects of parts and services, and is sold separately. Warranties and extended warranties should be evaluated before purchase due to the variability among manufacturers. School nutrition professionals should understand what is covered and not covered (e.g., abuse, misuse) and the types of warranties available. Common types of warranties include the following:

- A parts warranty covers repairs, replacement costs, or both repairs and replacement costs but may not cover labor or freight charges.
- A labor warranty covers labor costs to make repairs or replacements, but there may be a ceiling or maximum allowable cost.
- A carry-in warranty includes parts and labor if the equipment is delivered to the service location.
- An extended service contract or warranty covers the cost of repairs/replacements beyond the standard warranty for an additional cost. The range of coverage varies tremendously. Typically, the warranty is available for one to five years or beyond the standard warranty and must be purchased or begun when the equipment is purchased. For example, a branded water filtration system may extend the warranty of steamers and combi ovens.

Some standard conditions and limitations in an equipment warranty may include the following:

- Products may be warranted from the date of original installation or purchase date. Knowing which date is used is essential because some equipment may be stored for some time before it is put into operation after construction is completed. Most manufacturers provide a product registration website, which can track the starting date of the warranty.
- The liability of the manufacturer
- The standard labor charges incurred in the repair or replacement of the equipment, which includes a specific mileage limitation (e.g., 50 or 100 miles round trip)
- Full parts or limited parts
- Only parts and labor
- A listing of any parts whose warranty period varies from the standard as stated in the original condition
- A no-obligation statement to warrant the equipment and the specifics such as misapplication, mishandling, misuse, modification

Warranties may be available as extended warranties (i.e., twelve months beyond the original equipment warranty). Extended warranties are similar to buying insurance for a high-maintenance or repair piece of equipment. Before purchasing an extended warranty, determine whether it is cost-efficient. Some questions to consider in deciding on the value of an extended warranty include (Federal Trade Commission, 2022):

- What does the warranty or service contract cover, and are there hidden fees?
- What is the length of the coverage?
- What limitations apply?
- How difficult is the claims process?
- How long will it take to receive reimbursement?
- Are specially trained technicians required to service the equipment?
- What is the price of an authorized service agency call?
- How many miles is the installation site from the authorized service agency?

When to Replace Equipment

Outside of building new facilities or renovating older kitchens, needing to replace equipment is another reason school nutrition professionals may purchase equipment. Replacement planning schedules should be established for each program and reviewed at least annually to identify when quality issues arise, obvious defects are showing, or when maintenance costs or the frequency with which the equipment is not fully functional have made replacement necessary.

Analyze maintenance and repair costs to determine if the repair cost is worth the value of the equipment. Consider the following questions when thinking about repairing versus replacing a piece of equipment:

- How long will this repair likely last?
- Is there a problem getting needed parts in the future?
- Is this piece of equipment obsolete?
- Does this equipment pose a safety risk for staff?
- Is food quality, food safety, or speed of production negatively impacted?
- How much longer will the equipment continue to operate?

How long a piece of equipment will last before it may need to be replaced varies. Regular maintenance schedules and daily care increase the life of equipment. Calculating the TCO during the planning and budgeting process is extremely helpful.

Research on available and appropriate equipment for the task will require time and must be undertaken before specifications are written. Equipment specifications may be complex and challenging to understand for school nutrition professionals unfamiliar with terms of the industry. Many resources are available, including:

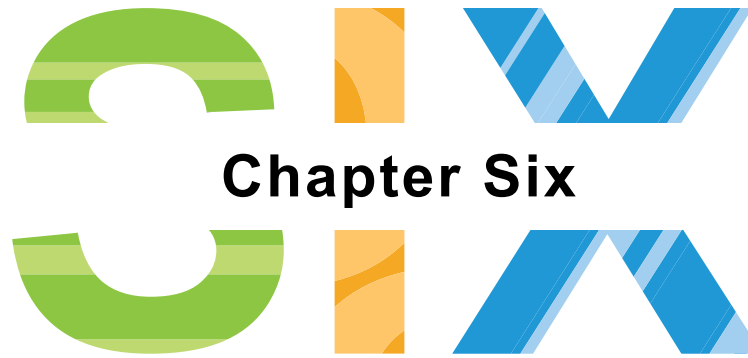
- Catalog specification sheets, commonly referred to as cut sheets
- Equipment catalogs, print and web-based
- Manufacturer information, print and web-based
- Sales representatives
- Trade journals
- Trade shows

Table 16 lists other sources of equipment specification information.

Table 16**Organizations Publishing Equipment Specifications**

Organization	Acronym	Description	Website
American Gas Association	AGA	The AGA is an energy trade association representing natural gas utility companies.	www.aga.org
Commercial Food Equipment Service Association	CFESA	CFESA provides equipment repair and maintenance training to service technicians.	https://cfesa.com/
Foodservice Equipment Reports	FER	FER is an online trade magazine that helps make informed buying decisions	https://www.fermag.com/
Foodservice Equipment and Supplies	FE&S	FE&S is an online trade magazine and media source for foodservice equipment manufacturers, dealers, and operators	https://fesmag.com/
National Restaurant Association	NRA	The NRA is a foodservice industry trade association. Educational resources for equipment purchasing, use, and care are available.	https://restaurant.org/
North American Food Equipment Manufacturers	NAFEM	NAFEM is a trade association for commercial foodservice equipment and supplies manufacturers and offers a Certified Foodservice Professional (CFSP) program as continuing education for the industry.	www.nafem.org
School Nutrition Association	SNA	SNA is the national association of school nutrition professionals. Member and non-member equipment educational resources available.	www.schoolnutrition.org

School nutrition professionals have many resources available to guide equipment selection and specification writing, which are clearly stated criteria to guide the seller in determining the desired product. The following Chapters, Six and Seven, include large and small equipment fact sheets to guide the planning team in writing equipment specifications. Suppliers rely upon detailed, written communication to determine the best product at the best price in their bid response.



Chapter Six

Large Equipment

CHAPTER SIX OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- Descriptions and intended use of common large equipment in school nutrition programs
- Different types of equipment and special features available
- Specification considerations

Writing large equipment specifications requires due diligence to identify and make the operation's best long-term purchasing investment decisions. This chapter lists large equipment by type, identifying general use, specification considerations including potential pros and cons, and special features that may be available. To create the equipment specifications, specification sheets from multiple manufacturers were reviewed and compiled. School nutrition operations are encouraged to use this information as a starting point in writing detailed large equipment specifications to get the desired product at the best price.

The plug type and voltage required for all mechanical equipment service connections should be identified and included in the specification. The National Electric Manufacturers Association (NEMA) is an ANSI-accredited trade organization that develops and maintains electrical and medical imaging standards. The planning team can reference information on non-locking plugs and receptables, and other helpful details such as the conversion from amperage (amps) to wattage (watts) on various electrical organization websites (ACUPWR, n.d.). School nutrition professionals should identify plug locations on the floor, from the ceiling, or on a wall or pole.

Air Fryers

Description To meet the USDA meal pattern requirements aimed at reducing fats and saturated fats and to improve children’s health, deep-fat fryers are strongly discouraged. As an alternative to frying in hot fat or vegetable oil, operators may consider greaseless, commercial air fryers to produce similar texture and taste of ovenable foods such as breaded chicken products and potatoes. Air fryers work like convection ovens, using fans to circulate hot air around the perforated pan or basket of food.

Type available • Air fryers

Intended use • Air fryers cook items using convection to mimic the texture and speed of deep-fat frying without the fat or oil.

Specification considerations

- Equipment material of the body, burner, and the unit housing options
- Dimensions (height, width, depth)
 - Overall dimensions
 - Cutout dimensions
- Power supply
 - Single-phase versus three-phase options depending on capacity needs
- Location
 - Standalone
 - Countertop

Specification considerations by type

Air fryer

- No ventilation hood required; check local code for requirements
- Electric energy source
- Prepares foods that are ovenable
- Capacity: Typically up to five pounds per load per oven
- Cooking time range: Two to 15 minutes, depending on product type
- Holding foods option
- Applicable for food truck operations

Special features available

- Programmable cook times
- Variety of basket sizes

Blast Chillers and Blast Freezers⁴

Description	Blast chillers and freezers safely cool foods rapidly through the temperature danger zone using a forced air current. Blast freezers help to reduce the formation of ice crystals, improving food quality. Units may have temperature probes and printing systems that allow cooling temperature monitoring documentation for HACCP systems. Because of the added fan components and monitoring capacity, they are also more expensive than standard refrigeration.
Types available	<ul style="list-style-type: none">• Countertop (capacity may not be suitable for institutional settings)• Reach-In• Roll-In• Under the counter
Intended use	Quick chilling of food products, especially hot leftovers or foods prepared in advance for service another day. Unit chills to safe refrigeration storage temperature at or below 41 °F, typically in 90 minutes or less. May continue to safely cool foods to below 0 °F for frozen storage.
Specification considerations	<ul style="list-style-type: none">• Interior and exterior material options• Requires more powerful/larger compressors than regular refrigeration, which may be self-contained or remote• Determine capacity needs: units range from 10 pounds to hundreds of pounds• Select easy-to-clean units with access to evaporator components, as they require periodic cleaning.• Units available with automatic defrost and evaporation systems• Dimensions (height, width, depth)<ul style="list-style-type: none">▪ Exterior: actual footprint<ul style="list-style-type: none">• For heavier, roll-in units, ensure concrete withstands cracking or include an insulated floor▪ Interior: pan or cart capacity▪ Door arrangement (right handle or left handle hinge)• Placement: Units work best when placed in sufficient areas for ventilation• Refrigerant type<ul style="list-style-type: none">▪ Chlorofluorocarbon (CFC): ozone depleting; being phased out (e.g., R12, R502)▪ Hydrochlorofluorocarbon (HCFC): less damaging to ozone; replaced CFC (e.g., R22, HP81)▪ Hydrofluorocarbon (HFC): not ozone-depleting; higher Global Warming Potential than CO₂; replacing CFC (e.g., R134a, R404A, R410A)⁵

⁴ Also known as a flash freezer

⁵ There is an expectation that the EPA will advise the industry to seek refrigerant options to replace HFCs with lower GWP (Global Warming Potential) products in the next five to 10 years. There is a chemical concern that the lower the GWP, the higher the flammability risk. Manufacturers mix refrigerants to achieve performance, minimize GWP and eliminate ozone depletion (ASHRAE, 2023).

Blast Chillers and Blast Freezers⁴

Special features (may not apply to all types of equipment)

- Alarms
- Self-cleaning condenser
- Thermometer probes for monitoring the chilling or freezing process
- Cooling data may be available via email, printer, memory/jump drive, or computer connection
- Touch screen temperature control
- Types of equipment legs and options for casters
- HACCP-compatible monitoring and documentation systems which have temperature probes and printing systems to allow product temperature monitoring (sold separately)

⁴ Also known as a flash freezer

Cold Holding and Serving Equipment

Description	Various cold holding and serving equipment are available to hold foods out of the temperature danger zone for optimal quality and safety. Equipment desired may either be mechanically refrigerated or non-mechanical, ice-cooled models. Some mechanically refrigerated food tables are also convertible to hot food tables with the flip of a switch. Cold food tables can be purchased with wells for pans or as open bin units, accommodating large trays of pre-portioned fruits and vegetables, wrapped sandwiches, or packaged salads. ⁶
Types available	<ul style="list-style-type: none">• Cold food drawers• Tables and wells• Display cases• Milk cooler (available as a bulk milk cooler and dispenser)• Mechanical units (walk-in and reach-in)⁷• Non-mechanical
Intended use	Used for the safe preparing, holding, service, and merchandising of refrigerated (typically 36 °F to 38 °F) and frozen foods (minus 10 °F to 0 °F). Not designed for cooling foods.
Specification considerations	<ul style="list-style-type: none">• Interior and exterior material options• Power (mechanical only)<ul style="list-style-type: none">▪ Voltage and amps: consider what other equipment is on the same circuit• Refrigerant type<ul style="list-style-type: none">▪ Chlorofluorocarbon (CFC): ozone depleting; being phased out (e.g., R12, R502)▪ Hydrochlorofluorocarbon (HCFC): less damaging to ozone; replaced CFC (e.g., R22, HP81)▪ Hydrofluorocarbon (HFC): not ozone-depleting; higher Global Warming Potential than CO₂; replacing CFC (e.g., R134a, R404A, R410A)⁸• Space<ul style="list-style-type: none">▪ External dimensions▪ Internal dimensions▪ Mechanical only: adequate ventilation is necessary to remove exhaust heat• Style of service use<ul style="list-style-type: none">▪ Self-serve and full-service options

⁶ Cold serving equipment is not designed to lower the temperature of food, rather, it is designed to hold already cold food at safe temperatures.

⁷ For cold holding cabinets, see Refrigeration: Walk-in and Reach-in

⁸ There is an expectation that the EPA will advise the industry to seek refrigerant options to replace HFCs with lower GWP products in the next five to 10 years. There is a chemical concern that the lower the GWP, the higher the flammability risk. Manufacturers are mixing refrigerants to achieve performance, minimize GWP and eliminate

Cold Holding and Serving Equipment

Specification considerations by type

Mechanical: cold food drawers, tables, and wells

- Single-phase electric outlet: may be configured to allow for refrigerated drawer or dry storage space⁹
- Available in stationary, mobile, and modular units with casters; typically foam in place of foam board fiberglass (with front panel color options), stainless steel, or a combination
- Number of wells, flat tops, and sizes vary, available with and without sneeze guards and tray slides
 - Note: Cold flat tops may not hold cold foods safely below 41 °F for long periods.
- Requires drain and condensate drip pan
- Available in drop-in style for built-in counter serving tops (e.g., Corian®, quartz)
- Available as specialty food preparation and holding tables (e.g., pizza, salads, sandwiches).
- Florescent and LED lighting: LED lighting releases less heat, resulting in increased energy efficiency
- Typically, a manual on/off control switch

⁹ Option for flexible service from hot to cold available.

Cold Holding and Serving Equipment

Specification considerations by type

Mechanical: display style

- Option for top or bottom mount refrigeration: condenser and evaporator; configurations may include interior placed evaporator; remote systems available
 - Combination cases (one refrigerated and one non-refrigerated) are available
 - Stainless steel exterior and interior or option for ABS plastic interior; aluminum and painted exterior available
 - Types and sizes vary greatly
 - Closed case with door(s) (typically glass) or open-air refrigerated for grab-and-go service
 - Closed system (full service)
 - More energy efficient
 - May reduce theft (applies to rear loading doors positioned to restrict product access to staff only)
 - Open system (self-serve)
 - Improved merchandising
 - Condensate issues in warmer climates
 - Less energy efficient
 - Both systems may offer the ability to close and lock after service hours
 - Consider floor drain needs to collect condensation; consider electric condensate evaporator
 - Length and number of shelves based on how fast product(s) will be sold; adjustable shelving available
 - Florescent and LED lighting: LED lighting releases less heat, resulting in increased energy efficiency
-

Cold Holding and Serving Equipment

Specification considerations by type

Non-mechanical

- Service line cold holding options
 - Ice machine
 - Ice/gel packs: sizes vary; some thermal packs are hot or cold, with no sweat, and foam options
 - Ice sheets: prefilled (water or proprietary gels), re-freezable, cut to adjust the size
 - Ice sheets: shipped flat; hydrated onsite, disposable (less expensive), and re-freezable options
 - Gel-filled pans: freeze and safely hold cold foods for up to 6 to 8 hours
- Typically, 5 to 6-foot-long molded, easy-to-clean material with sneeze guard; Service heights for small children available; available in a range of colors
- Mobile and tabletop
- Drain faucet may connect to the hose
- Mobile option for standard and heavy-duty casters with brakes
- Accessories (not available from all manufacturers): Tray slides, unit connectors, end tables and worktables without a sneeze guard, divider bars, vinyl covers, signage holders, custom vinyl merchandising wrap

Special features available (may not apply to all types of equipment)

- Adjustable temperature settings (all units)
- Doors or gates with locks
- Air curtains (display cases, walk-in and reach-in units)
- Force air curtain (display cases, milk coolers)
- Adjustable shelves (display cases and reach-in units)
- Tray slide (milk coolers)
- Types of equipment legs and options for casters (all units)
- Finishes (plastic, stainless steel, and millwork)
- Fold down cutting board (cold food tables)
- Under counter storage space (display cases and serving equipment)
- Self-cleaning compressors
- LED display panel
- Temperature probe
- HACCP-compatible monitoring and documentation systems which have temperature probes and printing systems to allow product temperature monitoring (sold separately)

Dishmachines and Pot and Pan Washers

Description Cleaning equipment is critical to any foodservice establishment. However, the purchase of a dishmachine is costly and requires dedicated space. Typically, the purchasing decision is made during new construction or when the unit is replaced. A dishmachine is one of the most expensive pieces of equipment, so careful decision-making is vital due to the impact of initial cost and anticipated long-term use.

- Types available**
- Undercounter is suitable for lower volume operations and locations with limited space, such as teaching kitchens.
 - Single tank/door styles can handle moderate volume operations and are flexible with multiple layouts.
 - Conveyor and flight types are suitable for high-volume facilities but require more physical space.
 - Pot, pan, and utensil washers are useful for larger equipment items that do not fit into traditional dishmachines and operations using disposables.

Intended use Cleaning and sanitizing dishes, glassware, flatware, smallware, and assorted kitchen equipment

Capacity considerations	Dishmachine type	Dish capacity per hour
	Single tank, door	1,550 (53–62 racks)
	Two-tank conveyor	5,850 (205–234 racks)
	Three-tank conveyor	6,650 (234–272 racks)
	Flight type	12,000 (racks are not used)

Dishmachines and Pot and Pan Washers

Capacity example

Staff should be able to operate dishmachines at approximately 70% efficiency. Greater efficiency may be unrealistic due to the time it takes to load and unload items. Using the 70% efficiency adjustment for capacity rule, a school's dishmachine capacity may be calculated:

- A 500-student elementary school serving approximately 250 children every 30 minutes during lunch needs to purchase a dishmachine. Six items (dishes, silverware, trays) are used for every child.
 - $250 \text{ students} \times 6 \text{ dishes/per student} = 1,500 \text{ dishes needed for a 30-minute lunch period}$
 - $1,500 \text{ dishes} \times 2 \text{ lunch periods per hour (every 30 minutes)} = 3,000 \text{ dishes needed per hour}$
 - $3,000 \text{ dishes divided by } .70 \text{ (this is the 70\% efficiency adjustment factor that you use to divide the number of dishes needed per hour)} = 4,286 \text{ dishes per hour}$
 - This school's calculated dishmachine capacity would be approximately 4,286 dishes per hour.
 - Therefore, using the above guidelines, the type of dishmachine that is likely to be needed for this school is a two-tank conveyor machine.
-

Dishmachines and Pot and Pan Washers

Specification considerations

- Interior and exterior material
 - Units may be insulated or uninsulated (insulated may save on utility costs)
 - Review adequate water pressure required: at least 20 pounds per square inch (psi) for the final rinse
 - Confirm pressure with a local plumber (inquire if the building/plumbing code includes any additional requirements)
 - Ventilation
 - Requires proper ventilation to prevent excessive humidity and potentially unsafe working conditions
 - Static versus dynamic options
 - Capacity: The capacity or volume required depends on the following (see capacity considerations section above):
 - Number of students
 - Number of meal periods
 - Number of dishes, silverware, and tray per student (none if disposables are used)
 - Number of pots, pans, and cooking utensils
 - Need for the speedy return of dishes for food production and service if an adequate number of dishes in reserve is unavailable
 - Length of the dishwashing cycle
 - Power
 - Single-phase and three-phase options
 - Voltage and amps: consider what other equipment is on the same circuit
 - Unit is hard-wired
 - Space
 - External dimensions
 - Internal dimensions
 - Moisture-resistant environments such as walls, floors, and ceiling
 - Consider noise reduction materials
 - Adequate lighting
 - Floor drains required
 - Non-skid flooring and mats recommended
 - Units available as corner-style, straight-line, or standalone system is used
-

Dishmachines and Pot and Pan Washers

Specification considerations

- Water¹⁰
 - Hot and cold-water supply
 - Supply line sizes vary
 - Water-saving features available
 - High-temperature machines require a hot water connection with an optional cold-water connection for drain water tempering.
- Sanitation Options
 - High-temperature Dishmachine
 - Pros
 - ◇ Dishes may dry faster
 - ◇ No chemicals required
 - ◇ Hot water may help remove soil and grease
 - ◇ Longer expected unit life without added chemical sanitizer
 - Cons
 - ◇ Require booster heater to reach sanitizing temperatures of 180 °F¹¹
 - ◇ Higher temperatures produce more steam, which will require a condensate hood at an additional cost unless an approved ventless system is used
 - ◇ Generally, higher energy costs
 - ◇ Higher unit cost (typically purchased, not leased)
 - Low-Temperature Chemical Dishmachine
 - Pros
 - ◇ Only requires 120 °F water temperature
 - ◇ Generally lower energy costs without a booster heater
 - ◇ Lower unit cost (may be leased from chemical supplier)
 - Cons
 - ◇ Dishes may take longer to dry
 - ◇ Requires chemical for sanitizing cycle
 - ◇ Chemicals may damage dishware and decrease the life of the unit
 - Chemical storage
 - Under counter
 - Wall mount

¹⁰ Water conservation efforts have reduced the amount of water used in dishwashing. To evaluate a purchase based on ENERGY STAR® requirements, go to https://www.energystar.gov/sites/default/files/specs/private/prog_req_draft_v2.0.pdf

¹¹ Gas booster heaters tend to heat water faster and are less expensive, but they must be vented to the outside.

Dishmachines and Pot and Pan Washers

Specification considerations by type

Stationary rack

Under the counter

- Ideal for small-volume operations
- May process up to 35 racks per hour depending on cycle length
- Recommend removable racks for speed-loading
- Equipped with single and dual (top and bottom) wash arms
- Automatic delimiting option available

Single tank, door type

- Ideal for medium-volume operations
- May process between 40 and 60 racks depending on cycle length
- Requires ventilation
- Booster heater is generally built-in
- May be converted after installation from hot water to a chemical machine or vice versa
- Available as a pot and pan washer with an extra-large opening

Conveyor

Single tank, door type

- Ideal for medium to large-volume operations
- See the dish capacity section
- Options for recirculating prewash or power prewash cycles
- Plastic curtains replace doors

Multiple tanks (rack and flight type)

- Ideal for large-volume operations
- See the dish capacity section
- Options for recirculating prewash or power prewash cycles
- Plastic curtains replace doors
- A thermometer in each tank

Dishmachines and Pot and Pan Washers

Special features (may not apply to all types of equipment)

- Automatic shutoffs for conveyor belts
 - Rinse station with hose and disposal
 - Auto delime
 - Analog and digital thermometer options
 - Gallons (of water used) per minute (GPM)
 - Large entrance and exit size to accommodate larger equipment
 - Blow-dryer: electric or steam-heated
 - Increases the length of the unit
 - May require an exhaust system
 - Water quality
 - A filtration system may be necessary
 - Consider water softener system based on municipal water reports to minimize the impact of mineral damage to machine and dishware
 - Types of racks needed (such as sheet pan racks, utility racks, and silverware racks)
 - HACCP-compatible monitoring and documentation systems that have temperature probes and printing systems to allow final rinse temperature monitoring (sold separately)
-

Food Waste Disposers and Pulpers

Description Food waste disposers (also called disposals) are usually integrated into the sink area set up at the dirty dish entry end of the dishmachine. Units may be installed for use in salad or vegetable preparation areas. Check municipal codes before installation to determine water, sewer system, and grease trap regulations.

Pulpers are expensive units typically set up in the area in front of the dishmachine to manage waste. Pulpers shred food waste, cartons, Styrofoam, plastic, light aluminum cans, and paper by grinding and adding water, creating a wet pulp. The liquid is extracted, resulting in a dry pulp that may be discharged via a rotating auger and shoot. Water is captured and recirculated, reducing sewer costs.

Pulpers can take food and other waste to reduce trash volume by 70 to 85 percent. Request a return on investment (ROI) before purchase to ensure that the upfront cost of the pulper would be a cost-effective investment compared to other cost factors. A manufacturer's ROI estimate should minimally consider the school nutrition program's garbage volume and mix, cost of trash pick-up, water and sewer costs, labor costs, cost of can liners, and any possible fines for leaking or vermin-infested dumpsters. Both disposers and pulpers require water supply and drainage.¹²

Types available

- Food waste disposer
- Waste pulpers

Intended use To dispose of food waste by pulverizing food scraps, bones, and sometimes other materials. They may be placed under the sink or as a standalone unit. The standalone units may also be placed in the prep or dish room areas.

Specifications considerations by type

Disposal

- Variable capacity and horsepower (HP) available
- Typically installed into the sink: check spacing (shorter housings available)
- Recommend use with overhead sprayer for dish scrape area
- Water-saving packages available
- Easy-to-operate control panel
- Water assisted scraper

¹² Lorenzini, B. (2011, August). Pulper proposition. Foodservice Equipment Reports Magazine. <https://www.fermag.com/articles/1492-pulper-proposition/>

Food Waste Disposers and Pulpers

Specifications
considerations by
type

Pulper

- Variable capacity and HP available
 - Two-stage operational configurations: close-coupled (less expensive option) or separate grind and water extraction locations
 - Magnetic capture device: highly recommended as it keeps metal utensils out of the grinding chamber, usually sold separately
 - Grinding mechanism materials: cast iron, hardened steel, or carbide-tipped alloy
 - Continuous feed
 - Remote on/off switch
 - Review the cleaning process and any materials required: must be cleaned daily to avoid unwanted smells
 - Ask for references or make site visits to see the unit in operation
 - Smaller options are available that fit under the dish table (about ¼ the size of a traditional pulper)
 - Identify pounds of waste processed per hour
 - Locate composter to pick up and manage pulp: www.findacomposter.com/
-

Freezer Holding and Storage

Description	<p>Freezers are essential to onsite production kitchens. The amount of freezer space needed is custom for each school and is based on the following:</p> <ul style="list-style-type: none">▪ Number of meal programs offered▪ Volume produced▪ Type of menu▪ Type of production▪ Type of recipes and ingredients (e.g., convenience food systems) may require additional freezer space▪ Frequency of food deliveries <p>Note: 28 pounds of food will fit into one cubic foot of freezer storage space.</p> <p>Freezers are comprised of three mechanical parts: an evaporator, compressor, and condenser. The evaporator converts the refrigerant into a gas for cooling. The compressor pumps the refrigerant through the unit. The condenser converts the refrigerant gas into a liquid to repeat the cooling process.</p> <p>Energy efficiency should be a consideration as these units run continuously over their lifespan. As an option for walk-in refrigeration, the freezer area may be accessed from inside the walk-in refrigerator, allowing the freezer's cold air to be released into the refrigerator compartment for food safety and energy efficiency.</p>
Types available	<ul style="list-style-type: none">• Pass-through• Reach-in• Roll-in• Walk-in
Intended use	Safe cold holding of frozen foods (USDA recommends minus 10 °F to 0 °F)

Freezer Holding and Storage

Specification considerations

- Interior and exterior material options
- Exterior options
 - Satin or polished stainless steel
 - Cost-saving option for anodized aluminum sides
- Dimensions (height, width, depth)
- Power supply
 - Single-phase and three-phase options
 - Walk-in units are hard-wired with a dedicated circuit
- Condenser
 - Air-cooled
 - May not operate as well in extremely hot climates or conditions
- Refrigerant type
 - Chlorofluorocarbon (CFC): ozone-depleting; being phased out (e.g., R12, R502)
 - Hydrochlorofluorocarbon (HCFC): less damaging to ozone; replaced CFC (e.g., R22, HP81)
 - Hydrofluorocarbon (HFC): not ozone-depleting; higher Global Warming Potential than CO₂; replacing CFC (e.g., R134a, R404A, R410A)¹³
- Insulation
 - Polyurethane (foam in place urethane) and extruded polystyrene (XPS) options
 - Polyurethane insulation has a higher initial R-value (6.0 to 8.0 per inch) than the less expensive XPS (5.0 per inch).
 - The Energy Independence and Security Act of 2007¹⁴ established minimum R-Value (the capacity of an insulating material to resist heat flow) requirements, and the DOE administers these regulations and required manufacturer certifications (also referred to as EISA/DOE):
 - Minimum R-32 for freezer walls and ceilings
 - R-28 for freezer floors
 - R-32 for non-glass freezer doors

¹³ There is an expectation that the EPA will advise the industry to seek refrigerant options to replace HFCs with lower GWP products in the next five to 10 years. There is a chemical concern that the lower the GWP, the higher the flammability risk. Manufacturers mix refrigerants to achieve performance, minimize GWP and eliminate ozone depletion (ASHRAE, 2023).

¹⁴ Energy Independence and Security Act of 2007, 42 U.S.C. ch. 152 § 17001 et seq. <https://www.govinfo.gov/content/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>

Freezer Holding and Storage

- Specification considerations
- EISA/DOE insulated glass
 - Double-paned glass must be heat-reflective and gas-filled
 - Triple-pane, heat-reflective glass is acceptable
 - Location
 - Kitchen preparation area(s)
 - Serving line(s)
 - Receiving area

Specification considerations by type

Walk-in freezer

- Automatic defrost
- Option for a remote condensing unit when needed for greater storage capacity, restricted height opening above unit, frequent door openings, and reduced noise level
- Option for self-contained condensing and evaporator when maximizing interior space, increasing the speed of installation without a refrigeration contractor
- Spring hinged door with door strip; automatic door closers (snubbers) that firmly shut unless the door is wider than 3'9" or taller than 7'
- Lighting minimums established by EISA/DOE:40 lumens per watt¹⁵
- Safety release handle with lockable latch
- Door heaters for de-icing: self-regulating heating cable
- Flooring (panels not always required)
 - Insulated aluminum panels: only support foot traffic
 - Flooring varies by weight load (500 to 800 lb/inch²)
 - Option for galvanized steel flooring for increased durability
 - Diamond pattern tread plate available to reduce the risk of slips and falls
 - Plywood underlay: weight load up to 1,000 lb/inch², supports carts and hand truck use
 - Reinforced floor: plywood with added tubular or metal grid support inside foam insulation; weight load up to 5,000 lb/inch²; recommended for central kitchen pallet use
- Check for separate plumbing connection and floor drain needs (insulated coolant lines are recommended)
- Entire unit may be installed outside of the facility

¹⁵ White ceilings may improve brightness.

Freezer Holding and Storage

Specification considerations by type

Pass-thru, reach-in, or roll-in freezer

- Automatic defrost
- Option for top or bottom mount refrigeration: condenser and evaporator
- Top mount
 - Maximum interior storage space
 - Lower top shelves for easy access
 - Condenser fan does not pull in floor dust or debris
 - More difficult to maintain and repair due to difficult access
 - Less efficient due to heat rising
- Bottom mount
 - Generally more expensive
 - No stoop bottom
 - Easier to service
 - Risk of condenser fan pulling in floor dust and debris
 - Heat can rise into the cabinet
 - Refrigerant lines run through the back of the cabinet, taking up storage space
- Capacity
 - Single: 20–25 cubic feet
 - Double: 46–52 cubic feet
 - Triple: 70–80 cubic feet
- Adjustable shelves or slides or roll-in rack¹⁶
- Full and half doors available (half doors reduce the amount of cold air loss when opened but reduce storage space); determine preferred right or left hinge installation; three hinge doors provide more stability
- Door heaters for de-icing: self-regulating heating cable
- Door open alarm
- Combination refrigerator/freezer available

¹⁶ Slides are typically adjustable but require the use of pans.

Freezer Holding and Storage

Special features available (may not apply to all types of equipment)

- Condensate drainage system
 - Door latch style: latch or magnetic seal (provides tighter close)
 - Door sweeps (walk-in units)
 - Matching ramps (roll-in and walk-in units)
 - Kick plate door protector (walk-in units)
 - Exterior digital and analog thermometers
 - Hinge: 90° stay open (stay open features also available at 120°, or 180°) (all units)
 - Type of equipment legs and option for casters (reach-in units)
 - Lighting: shatterproof LED or incandescent bulbs with safety shields (all units with lighting options)
 - Self-cleaning condensers
 - HACCP-compatible monitoring and documentation systems which have temperature probes and printing systems to allow product temperature monitoring (sold separately)
-

Hot Holding and Serving Equipment

Description	Various hot holding and serving equipment is available to hold foods out of the temperature danger zone for optimal quality and safety to meet service demands. For extended holding periods (greater than one hour), consider humidified cabinets to better maintain food quality and visual appeal.
Types available	<ul style="list-style-type: none">• Display cases• Hot holding and proofing cabinets or drawers• Steam table wells (open and sealed options; may be built-in, mobile, and modular)
Intended use	Hot holding equipment provides a food holding environment at or above 135 °F for quality and safety for short periods. In addition, some hot holding cabinets are equipped with low temperature and humidity controls for proofing bakery products. ¹⁷
Specification considerations	<ul style="list-style-type: none">• Interior and exterior materials<ul style="list-style-type: none">▪ May be constructed of aluminum, fiberglass, stainless steel, or combinations• Dimensions (height, width, depth)<ul style="list-style-type: none">▪ Exterior▪ Interior capacity (where applicable)▪ Door arrangement (right handle or left handle hinge, where applicable)▪ Number and depth of the wells (where applicable)• Power supply<ul style="list-style-type: none">▪ Gas versus electric options<ul style="list-style-type: none">• Gas equipment<ul style="list-style-type: none">◇ Gas lines required◇ Type of gas: natural or propane◇ Supply line size◇ Emergency shutoff valve required▪ Electric equipment<ul style="list-style-type: none">◇ Single-phase and three-phase options◇ Desired cord length◇ Considered more energy efficient• Control type: electronic or manual

¹⁷ Hot holding equipment should never be used to cook foods to the required final internal temperature.

Hot Holding and Serving Equipment

- Steam tables and sneeze guards (where applicable)
 - Pan capacity and size of pans that will fit on the table or into the wells
 - Accompanying lids are available in stainless steel and heat-resistant plastics
 - Consider half-size lids to cover food partially to maintain quality and safety during service
 - Sneeze guards
 - Acrylic (may be referred to as Plexiglas®) or glass options
 - Available in many styles according to the manufacturer
 - Check and adhere to State and local sneeze guard requirements

Specification considerations by type

Display cases

- Typically countertop
- 120-volt (single phase)
- Note: dry, unrefrigerated units available for shelf-stable foods
- Option for self-service or rear-loading only
- Option for a fan to circulate air
- Thermostatic heat controls (may set temperature); temperature gauge display
- Options for mirrored interior, glass doors, and interior lighting for improved merchandising (appearance)
- Tempered glass windows are available

Hot holding cabinet

- Types: reach-in, roll-in, mobile
 - Top or bottom-mounted heating system (efficient heat recovery needed after doors are opened and closed)
 - Option for humidity control and fan to circulate air; proofing and holding options
 - May be insulated (more costly) or non-insulated (less costly)
 - Thermostatic heat controls with temperature gauge display
 - Other mobile options: push/pull handles, color treatments
 - Consider the number and type of pans needed before determining shelving; options include adjustable or stationary slides
 - Door options: full, half (minimizes heat loss when doors are open), glass (allows for a more accessible view when restocking)
 - Tempered glass windows are available
-

Hot Holding and Serving Equipment

Specification considerations by type

Hot holding drawers

- Types: built-in or freestanding
 - Each drawer has a thermostatic heat control
 - Stationary and mobile options are available
 - Available in narrow and standard drawer sizes
 - Option for vents to allow airflow to control humidity
-

Steam table, wells open (dry)

- Heating element under open well
 - May be used with a spillage/water pan to create steam
 - No plumbing requirements
 - Available in drop-in style for built-in counter serving tops (Corian® and quartz)
 - Available in stationary mobile and modular units (typically fiberglass, stainless steel, or a combination)
-

Steam table, wells sealed

- Heating element sealed
 - Available with auto-fill plumbing or consider installing a nearby hose reel
 - Option for drain system (consider wet/dry vac for removing water from wells without drains.)
 - Hot water improves heat transfer
 - Available in drop-in style for built-in counter serving tops (e.g., Corian®, quartz)
 - Available in stationary mobile and modular units (typically fiberglass, stainless steel, or a combination)
-

Hot Holding and Serving Equipment

Special features available (may not apply to all types of equipment)

- Digital or analog thermometer
 - The ability to keep food hot or cold (convertible tables)
 - Covers for the equipment (display cases)
 - Steam table pan and lid options: stainless, high heat-resistant polycarbonate in amber and black (steam tables)
 - Types of equipment legs and options for casters (regular or heavy duty) (all units)
 - Undershelves (display cases and steam tables)
 - Touch screen
 - Induction hot food wells (steam tables)
 - Corner or perimeter bumpers (display cases and hot holding/proofing cabinets)
 - Timers (hot holding/proofing cabinets)
 - Fans (display cases and hot holding/proofing cabinets)
 - HACCP-compatible monitoring and documentation systems which have temperature probes and printing systems to allow product temperature monitoring (sold separately)
-

Ice Machines¹⁸

Description Ice machines in school nutrition operations provide a safe source for ice as a food ingredient and for holding cold foods and cooling foods using a one or two-stage cooling method.

- Types available**
- Modular or ice machine head (ice machine with bin)
 - Undercounter ice machine with bin
 - Ice machine with dispenser

Intended use This equipment is used to produce, dispense, and store ice safely.

Capacity considerations Ice machines are selected based on 24-hour ice yields, ranging from 50 pounds to almost 3,500 pounds of ice.

When selecting the ideal ice yields, consider all ice applications and production locations, such as holding, serving, cooling, and usage by others on campus. Multiple ice machines in various areas may be best suited for larger operations.¹⁹

Capacity example Large commercial foodservice operations typically utilize the ice machine with bin style due to capacity and output needs. Cafeteria-style operations may use one pound of ice per customer. Beverage service ice needs are estimated at eight ounces per 12 to 16-ounce cup.

Rule of thumb formula: $\text{Weekly volume} \div \text{five days} \times 1.2 = \text{Average daily ice usage}$

For example: $500 \text{ lb} \div \text{five days} \times 1.2 = 120 \text{ lb average daily ice usage}$

Specification considerations by type

Ice machine with bin

- Floor and under-counter options
- Interior and exterior material options
- Dimensions (height, width, depth)
 - Exterior: actual footprint
 - Stackable systems available
 - Under-the-counter units available
 - Consider one foot of open space on all sides of the machine head for ideal ventilation
 - Interior (bin size)
 - Bin volume calculated up to the intended shutoff level
 - Determine bin size based on peak operational needs by the day, not by the week, as some days may require more ice than others
 - Door arrangement and number of doors (if applicable)

¹⁸ Also known as an ice maker/dispenser

¹⁹ Recommend foodservice use only ice machines to avoid cross contamination from the use by other department staff.

Ice Machines¹⁸

- Capacity/output per 24-hour period
 - See manufacturer sizing chart for volume production
 - Ice may be removed from the bin and stored in the freezer for additional ice needs
- Type of ice: cube, flake, or nugget
- Power supply
 - Single-phase and three-phase options (large capacity units may require three-phase)
- Refrigerant type
 - Chlorofluorocarbon (CFC): ozone depleting; being phased out (e.g., R12, R502)
 - Hydrochlorofluorocarbon (HCFC): less damaging to ozone; replaced CFC (e.g., R22, HP81)
 - Hydrofluorocarbon (HFC): not ozone-depleting; higher Global Warming Potential than CO₂; replacing CFC (e.g., R134a, R404A, R410A)²⁰
- Type of condensing unit²¹
 - Air-cooled: most cost-effective
 - Poor ventilation impacts ice yields
 - A 10 °F increase in ambient (room) air temperature above 90 °F reduces ice production by 5 percent (ice in bin melts).
 - Removable air filters
 - Water cooled: best choice when the ambient air temperature is greater than 80 °F to 90 °F
 - Remote systems (also known as split system): machine head installed separately from the bin
 - More expensive to install
 - Air-cooled system
 - May be up to 100 feet away from the kitchen, outdoors, or in a common refrigeration machine room

¹⁸ Also known as an ice maker/dispenser

²⁰ There is an expectation that the EPA will advise the industry to seek refrigerant options to replace HFCs with lower GWP products in the next five to 10 years. There is a chemical concern that the lower the GWP, the higher the flammability risk. Manufacturers mix refrigerants to achieve performance, minimize GWP and eliminate ozone depletion (ASHRAE, 2023).

²¹ [The Air Conditioning, Heating, and Refrigeration Institute](#) (AHRI) maintains Performance Rating Standards of Automatic Commercial Ice-makers (2023). Before 2016, standards for ambient air and incoming water temperatures were lower – 70 °F ambient air and 50 °F incoming water. Be sure to ask the manufacturer what standards ice production is based on.

Ice Machines¹⁸

- Water supply to the equipment
 - Location: a supply from underground is ideal for maintaining a lower incoming water temperature
 - Incoming water pressure
 - Incoming water temperature: for every degree above 70 °F, ice yields are diminished
 - Water drainage required
 - Type of insulation
 - Filtration system
 - Before purchasing the system, obtain and provide a municipal water report to the filtration company for evaluation and best unit selection to improve performance, minimize maintenance and repairs, and maintain the warranty. A water sample could be taken at the point of use for testing.
 - Noise level of the unit
-

Ice machine with dispenser

- Interior and exterior material options
 - Dimensions (height, width, depth)
 - Exterior–actual footprint
 - Consider 1 foot of open space on all sides of the machine head for ideal ventilation
 - Storage capacity varies
 - Capacity/output per 24-hour period
 - See manufacturer sizing chart for volume production (units typically available up to over 700 lb per 24 hours)
 - Bin storage capacity varies
 - Type of ice: cube, flake, or nugget
 - Models available with water dispenser
 - Power supply
 - Single phase
-

- Refrigerant Type
 - Chlorofluorocarbon (CFC) – ozone depleting; being phased out (e.g., R12, R502)
 - Hydrochlorofluorocarbon (HCFC) – less damaging to ozone; replaced CFC (e.g., R22, HP81)
 - Hydrofluorocarbon (HFC) – not ozone depleting; higher Global Warming Potential than CO₂; replacing CFC (e.g., R134a, R404A, R410A)²²
- Type of condensing unit
 - Air-cooled: most cost-effective
 - ◇ Poor ventilation impacts ice yields
 - ◇ A 10 °F increase in ambient (room) air temperature above 90 °F reduces ice production by 5 percent (ice in bin melts).
 - ◇ Removable air filters
 - Water cooled: best choice when the ambient air temperature is greater than 80 °F to 90 °F
- Water supply to the equipment
 - Incoming water pressure
 - Incoming water temperature: for every degree above 70 °F, ice yields are diminished
- Water drainage required
- Type of insulation
- Filtration system
 - Before purchasing the system, obtain and provide a municipal water report to the filtration company for evaluation and best unit selection to improve performance, minimize maintenance and repairs, and maintain the warranty. A water sample may be taken at the point of use for testing.
- Noise level of the unit
- Activation arms or hands-free touchless sensors are available

¹⁸ Also known as an ice maker/dispenser

²² There is an expectation that the EPA will advise the industry to seek refrigerant options to replace HFCs with lower GWP products in the next five to 10 years. There is a chemical concern that the lower the GWP, the higher the flammability risk. Manufacturers mix refrigerants to achieve performance, minimize GWP and eliminate ozone depletion (ASHRAE, 2023).

Ice Machines¹⁸

Special features available (may not apply to all types of equipment)

- Programmable ice production and sanitation reminders (ice machine with bin)
- Knuckle and thumb guard on the scoop (ice machine with bin)
- Bin liner (ice machine with bin)
- Self-diagnosis for maintenance (ice machine with bin)
- Virus and bacteria inhibitors
- Sensing software (to determine if more ice needs to be made)
- Varying types of shutoffs are available
- External scoop holder (ice machine with bin)
- Automatic ice machine cleaning (ice machine with bin)
- Adjustable legs

¹⁸ Also known as an ice maker/dispenser

Induction Cooktops²³

Description	<p>Induction cooking provides instant heat without open flames or hot spots using a magnetic field created by connecting the copper coil (inside unit) and magnetic metal cookware. The electric current is induced, heating only the pan, and the cooktop stays cool. The best pan choices contain conductive ferrous, a highly magnetic metal (made of magnetic stainless steel, cast iron, or nickel) and have a flat or three-dimensional bottom (woks). These types provide the best contact with the induction unit's surface. Pans made with non-magnetic metals (such as copper and aluminum) will not work on induction cooktops unless the non-magnetic metal is used only in the interior of the base of the pan (sandwiched between two pieces of magnetic metal) to improve the evenness of the heating of the pan.²⁴</p> <p>An induction hob has several advantages. Induction cooking has an 85–93% energy efficiency compared to a 30–44% gas flame energy efficiency. There is an HVAC system savings due to less heat generation. The pan heats faster than a gas flame, allowing more precise temperature control. Finally, no hood may be required, and the ceramic glass surface is easy to clean.²⁵</p>
Types available	<ul style="list-style-type: none">• Countertop induction ranges• Drop-in induction ranges• Induction ranges• Wok ranges• Induction griddle• Induction buffet table
Intended use	<ul style="list-style-type: none">• Induction ranges sit on a countertop or in a housing unit.• Drop-in induction ranges mount flush to the countertop (seal properly to prevent moisture issues)• Wok ranges allow for stir-fry and other wok applications.• Induction griddles cook sandwiches, eggs, meat, and other menu items.• Induction buffet tables are used for food service and display cooking.

²³ Also known as induction hobs

²⁴ It is recommended not to heat empty pans on the induction cooktop to prevent damage to the cooktop.

²⁵ Sherer, M. (2020, May) Choosing Induction for the Back-of-House. Foodservice Equipment Reports Magazine. <https://www.fermag.com/articles/9918-how-to-spec-induction-for-production-cooking/>

Induction Cooktops²³

Specification considerations

- Equipment material of the body, burner, and the unit housing
- Dimensions (height, width, depth)
 - Overall dimensions
 - Cutout dimensions
 - Clearance space for an ideal operation
- Cooking surface
 - Diameter range
- Knowledge of recommended cookware bottom diameter as well as the current inventory of cookware compatible with induction technology
- Power supply
 - Single-phase and three-phase options
- Temperature range
 - Number of power levels
 - Temperature control varies from knobs to more precise touch screens
 - Options for power or temperature increments
 - Thermostatic sensors: options for two or four
 - Suggested weight capacity per burner
 - Footing options (if applicable)
 - Hob stays cool, allowing employees to be more comfortable
 - Ranges vary
 - Internal fans help to keep the electronics cool, where available

²³ Also known as induction hobs

Induction Cooktops²³

Special features available (may not apply to all types of equipment)

- Locking feature to prevent timer and temperature changes
- Multiple cooking modes that can be controlled independently (when the equipment has numerous burners)
- Auditory alerts/timers
- Adjustable timer
- Standby mode option
- Equal heat distribution
- Programmable cooking: some units provide a USB port for updating firmware
- Pan detection: the unit will not operate until the magnetic field is closed
- Splash guard
- Air intake kit
- Front grease trap
- Grease drawer
- Grease filter
- Mounting kit
- Legs, feet, and casters
- Additional shelves

²³ Also known as induction hobs

Mixers

Description Most mixers are either standard/planetary or spiral. Standard/planetary mixers are valuable and versatile because of their various attachments. Mixers range from small, counter, or tabletop models to large floor models suitable for high-volume operations.

Types available

- Standard/Planetary Countertop mixer
- Standard/Planetary Floor mixer
- Spiral mixer

Intended use Mixers efficiently and consistently combine ingredients, typically in a bowl. They can be used for multiple types of food production: whipping, mixing, blending, chopping, emulsifying, combining wet and dry ingredients, and mashing and pureeing.

Specification considerations

- Dimensions (height, width, depth)
 - Exterior: actual footprint
- Bowl material
 - Stainless steel
 - Tinned (must be periodically retinned and may cause an undesired color change in some foods)
 - Bowl guard for staff safety

Specification considerations by type

Floor and countertop mixers

- HP varies: $\frac{1}{3}$ –5 HP motor; single-phase and three-phase options (identify HP needed to prepare the dough, where applicable)
- Standard/Planetary versus spiral mixers
 - Standard/Planetary: one motor for fixture attachment with fixed bowl
 - Attachments available for other applications (e.g., grater, grinder, shredder, slicer)
 - Bowl capacity: five to 140 quarts (counter/tabletop typically five to 20 quarts)
 - Floor or countertop models
 - Spiral: two motors (one for bowl and one for fixture/arm)
 - Ideal for dough production (dough does not heat during kneading)
 - Lower revolutions per minute (RPM) than planetary
 - Floor model only
- Belt-driven
 - Number of integral speeds: may change speeds during operation
 - Belts wear out much quicker than gears
 - Belts can slip due to excessive product load, leading to inconsistencies from batch to batch





Mixers

- Gear-driven
 - More powerful
 - More expensive to repair
 - Typically high, medium, and low speed only: must stop operation to change gears (some models allow gear change during operation)
 - Noisier
- Multiple speeds are available; three speeds are the most common
- Options available include adaptor rings to fit smaller bowls, bowl dolly/truck, bowl extension ring to increase bowl height, bowl scraper, splash cover, ingredient shoot, power lift to raise the bowl
- See the mixer attachment chart

Special features available (may not apply to all types of equipment)

- Neoprene foot pads
-

Common types of mixer attachments

Name	Flat beater or paddles	Wire whip	Dough hook or arms	Pastry knife
Attachment				
Consistency of batter	Medium	Light	Heavy	Heavy
Mixer speed	Medium	High	Low	Low
Product examples	Quick breads Smashing fresh potatoes and other vegetables	Egg whites Salad dressing Sauces	Bread Bagels Pizza dough	Pastry dough

Ovens

Description	<p>Many types of ovens are available, with convection and combination ovens (often referred to as combi-ovens) being the most commonly used in schools. Always look at production schedules before making final cooking equipment selections, making sure all menu items can be prepared as needed. The menu may require several types of ovens or multiple ovens of the same type.</p>
Types available	<ul style="list-style-type: none">• Combination• Convection• Conventional• Conveyor• Cook and hold (includes smoker)• Deck• Microwave
Intended use	<ul style="list-style-type: none">• Combination ovens can be used as a steamer, a convection oven, or a combination of the two.• Convection ovens use fans inside of the unit to circulate the hot air. These ovens cook faster and more evenly than conventional ovens. Some convection ovens have the feature of being able to introduce moisture to the cooking cabinet for special cooking processes (such as baking and refreshing foods).• Conventional ovens use radiant heat from the bottom of the oven without fans. These ovens are often part of a larger “range” with burners and griddles above the oven cabinets.• Conveyor ovens (most common) use a conveyor belt that feeds food through the cooking chamber. These ovens are programmable in relation to speed and temperature. The conveyor oven’s heat source is typically radiant heat (gas or electric).• Conveyor ovens may have the added feature of using pressurized jets to break through the cold halo that forms inside the chamber and heats food from above and below, resulting in faster cooking times.• Cook and hold and smoker ovens are designed to cook food at low temperatures for longer cook times to safe internal temperatures using a calibrated probe or timer, then automatically reduce to safe holding temperatures. Ideal for reducing moisture and yield loss from foods such as meats and poultry. A smoker oven can use wood chips or pellets for added flavor and aroma.

Ovens

- Intended use
- Deck ovens are ideal for baking and cooking bread, pizzas, and other baked goods. These ovens retain heat better than conventional ovens, using a narrow opening of about seven to 12 inches in height and wide and deep cavities.
 - Microwave ovens use electromagnetic waves for cooking food. Commercial microwaves are larger and more durable than residential units. Uses of microwave ovens in commercial kitchens includes cooking, defrosting, reheating, and steaming vegetables. However, foods are unable to brown or caramelize in microwave ovens.
 - Rapid cook or speed ovens are generally small, primarily ventless, countertop units that use two or more heat transfer methods to cook quickly or heat foods. Options may include microwave, convection, radiant heat, or a combination.

- Specification considerations
- Interior and exterior material options
 - Power
 - Single-phase and three-phase options
 - Voltage and amps: consider what other equipment is on the same circuit
 - Gas convection ovens
 - Propane and natural gas options available
 - BTU (British Thermal Units) vary from 44,000 to more than 80,000²⁶
 - Space for ventilation
 - Depth needed under the hood system (check local regulatory codes)

- Specification considerations by type
- Combination**
- Reach-in (half-size and double stack available) and roll-in
 - Gas or electric (single and three-phase options); gas requires an electric energy source for controls, filtered and unfiltered water, and drain; requires air gap drain between unit and floor
 - Variety of control options: digital, manual, and programmable cook cycles
 - Capacity determined by the size of unit purchased
 - Cold water connection required: Provide municipal water source report to water filtering provider to determine needs or take a water sample at the point of use.
 - Steam: manual or programmed by the manufacturer and cannot be adjusted
 - Boiler system (recommended when fast recovery is needed) or boilerless option (less expensive)

²⁶ A British thermal unit (BTU or Btu) is a measure of the heat content of fuels or energy sources. It is the quantity of heat required to raise the temperature of one pound of water by 1 °F.

Ovens

- Self-cleaning option (may require proprietary chemicals for cleaning to preserve warranty)
 - Side-mounted hose and sprayer option; chemical storage space below the unit
 - Requires ventilation
-

Convection

- Reach-in (double stack option with varying work heights) and roll-in
 - Gas or electric (gas unit may be more expensive and have lower energy costs over time)
 - Direct gas-fired (DGF): The burner is directly under the oven cavity and pushes heat in direct contact with the product.
 - Indirect fired may be gas or electric: The burner does not have direct contact with the product but instead uses a heat exchanger.
 - Capacity determined by the size of unit purchased. Bakery depth available: 4-inch deeper cavity to allow pans to be loaded in left-to-right or front-to-back for increased airflow.
 - Doors: single or double
 - Open separately or synchronized (recommended) to open and close simultaneously.
 - Fan speed control option
 - Thermal glass windows
 - Gas ovens and some electric ovens require ventilation
-

Conveyor

- Capacity is determined by the length of the belt
 - Low: 31–36 inches
 - Medium: 40–50 inches
 - High: 78–80 inches
 - Note: Belt width varies. Wider options may allow two or more pans through side-by-side.
 - Identify product entry dimensions to ensure it fits menu needs: some units are adjustable (smaller openings increase energy efficiency).
 - Mechanical and electronic controls are available. Electronic options may provide programmable cooking and repair diagnostics.
 - Ventless electric options that do not require an exhaust hood (use built-in catalytic converters; more expensive) are available.
 - Stackable
-

Ovens

- Single and split-belt systems allow two speeds (belt splits may be 50/50, 70/30, and 65/35). Some belts may run in either direction (bidirectional).
 - Identify any cleaning challenges for staff. Some units heat to 1,000 °F to burn residue.
 - Requires ventilation
-

Cook and hold

- Countertop, reach-in, and roll-in (pass-through available)
 - Electric (single-phase and three-phase, depending on capacity): does not require a vent hood
 - Fuel-heated smokers (coal or wood) are not recommended for use in school nutrition programs
 - Capacity based on the number of sheets and steam table pans
 - Shelving may be wire style or slides (slides require pans that may reduce air circulation)
 - Other features may include wireless programming, water fill (ideal for proofing), convection fans, glass doors
 - May require ventilation
-

Deck

- Deck material: most common is steel; stone is available but porous and not ideal for greasy foods; fibrament (proprietary synthetic) is available
 - Gas or electric
 - Higher BTU Temperatures (up to 500 °F; 650 °F for pizza deck oven), check local codes for energy availability
 - Stackable units
 - Doors: spring-loaded or counterbalanced (glass available)
 - Insulation and oven lining vary
 - Requires ventilation
-

Ovens

Microwave

- Cabinet sizes vary: 13 to 25 inches wide, 13 to 25 inches deep, and 13 to 19 inches high
- Electric using magnetron tubes: typically rated for 3,300 and 3,800 hours of use
- Wattage (1,000–3,200 W): Higher equals faster cooking and defrosting times
- Stainless steel cabinet and cavity more durable than painted interior
- Cubic cooking capacity depends on chassis size and wattage (e.g., 1.6 cubic food at 3,500 watts may accommodate full-size steam table pans)²⁷
- No ventilation required
- Options for programmable cooking, filter with clean filter reminder

Special features available Listed above under specifications by type

²⁷ The chassis is the internal metal structure (or framework) of the appliance that provides support and rigidity. It is typically made of metal and designed to be strong and durable to withstand regular use. It serves as a shield to contain the microwaves generated by the magnetron, the component that produces the microwaves that cook the food, and as a ground for the microwave to ensure all electrical currents are safely directed away from the user.

Ranges²⁸

Description	School nutrition programs commonly use steamers, convection ovens, or combi ovens for cooking needs. However, depending on the type of cooking, some smaller operations may find range cooking necessary for sautéing or heating stock pots and saucepans. Ranges may accompany oven space or storage space below the unit.
Types available	<ul style="list-style-type: none">• Countertop• Modular/floor standing: heavy-duty commercial versus restaurant range
Intended use	<ul style="list-style-type: none">• A versatile piece of kitchen equipment that can fry, grill, broil, sauté, boil, simmer, and reheat foods
Specification considerations	<ul style="list-style-type: none">• Interior and exterior material• Dimensions (height, width, depth): common widths include 24 inches (4 burners with space saver oven), 36 inches (6 burners with full-size oven), and 60 inches (10 burners with two full-size ovens)<ul style="list-style-type: none">▪ Exterior: actual footprint▪ Interior: pan or cart capacity▪ Top configuration can be open burners (gas), hot plate, or griddle▪ Door arrangement (right handle hinge)• Power supply<ul style="list-style-type: none">▪ Electric and gas<ul style="list-style-type: none">• Electric<ul style="list-style-type: none">◇ Slower to preheat or cool◇ Temperature control knobs• Gas<ul style="list-style-type: none">◇ Propane and natural gas options available◇ Require no preheating◇ Infinite range of heat settings• Cooktops<ul style="list-style-type: none">▪ Open (exposed burner)<ul style="list-style-type: none">• Ideal for fast, intermittent cookery▪ Closed<ul style="list-style-type: none">• Cast iron or steel plates: one-half to one-inch thick• Commonly 12 x 24 inches; available in multiples• Available in griddle-type with grease trough in chrome-plated steel for direct food contact

²⁸ Also known as a stove

Ranges²⁸

- Hold more pots and pans
- Longer to preheat and cool
- Surface configurations: number of burners, size of burners, clog-resistant burners, specialty burners available such as a wok
- Ventilation required
- Surface type and combinations
 - Open flame, flat hot top (not for direct food contact), flat griddle top (direct food contact allowed), French hot plate (round disk), grill, and wok
- Bases
 - Open, oven, refrigerated, or dry storage

Special features available (may not apply to all types of equipment)

- Salamander
- Cheese melter
- Griddle broiler
- Charbroiler
- Adjustable feet or casters
- Splatter screen
- Back guard
- Kick plate
- Extension rack
- Easy lift grates
- Crumb tray
- Back shelf

²⁸ Also known as a stove

Refrigerators: Reach-In and Walk-In²⁹

Description	<p>Refrigerators are essential to onsite production kitchens. The amount of refrigerated space needed is custom for each school and based on the following:</p> <ul style="list-style-type: none">▪ Number of meal programs offered▪ Volume produced▪ Type of menu▪ Type of production▪ Type of recipes and ingredients▪ Frequency of food deliveries <p>Note: 28 pounds of food will fit into one cubic foot of refrigerated storage space.</p>
Types available	<ul style="list-style-type: none">• Reach-in• Roll-in• Walk-in
Intended use	<p>Safe cold holding of refrigerated foods (typically 36 °F to 38 °F)</p> <p>Note: Ambient refrigerated air temperature must be at least 39 °F (two degrees less to hold foods safely at 41 °F)</p>
Specification considerations	<ul style="list-style-type: none">• Dimensions: height, width, depth• Power supply<ul style="list-style-type: none">▪ Single-phase: pass-through, reach-in, roll-in▪ Walk-in units are hard-wired with a dedicated circuit• Condensers<ul style="list-style-type: none">▪ Air-cooled<ul style="list-style-type: none">• Do not operate as well in extremely hot climates or conditions• Refrigerant type<ul style="list-style-type: none">▪ Chlorofluorocarbon (CFC): ozone depleting; being phased out (e.g., R12, R502)▪ Hydrochlorofluorocarbon (HCFC): less damaging to ozone; replaced CFC (e.g., R22, HP81)▪ Hydrofluorocarbon (HFC): not ozone depleting; higher Global Warming Potential than CO₂; replacing CFC (e.g., R134a, R404A, R410A)³⁰

²⁹ Also known as a cooler

³⁰ There is an expectation that the EPA will advise the industry to seek refrigerant options to replace HFCs with lower GWP products in the next five to 10 years. There is a chemical concern that the lower the GWP, the higher the flammability risk. Manufacturers mix refrigerants to achieve performance, minimize GWP and eliminate ozone depletion (ASHRAE, 2023).

Refrigerators: Reach-In and Walk-In²⁹

- Insulation
 - Polyurethane (foam in place urethane) and extruded polystyrene (XPS) options
 - Polyurethane insulation has a higher initial R-value (6.0 to 8.0 per inch) than the less expensive XPS (5.0 per inch).
 - The Energy Independence and Security Act of 2007 established minimum R-Value (the capacity of an insulating material to resist heat flow) requirements and the DOE administers these regulations and required manufacturer certifications (also referred to as EISA/DOE):
 - Minimum R-25 for refrigerator walls and ceilings
 - R-25 for refrigerator non-glass doors
 - EISA/DOE insulated glass
 - Double-paned glass must be heat-reflective and gas-filled
 - Triple-pane, heat-reflective glass only is acceptable
- Location
 - Kitchen prep area
 - Serving line
 - Receiving area

Specification considerations by type

Walk-in refrigerator/cooler

- Exterior materials: aluminum and fiberglass
- Remote condensing unit option: restricted height above unit, frequent door openings, reduced noise level
- Self-contained condensing and evaporator option: ideal for maximizing interior space, speed of installation
- Self-closing, spring hinged door with door strip; automatic door closers (snubbers) that firmly shut unless the door is wider than 3 feet 9 inches or taller than 7 feet
- Lighting minimums established by EISA/DOE: 40 lumens per watt³²
- Safety release handle with lockable latch
- Flooring (insulated panels or recessed with insulation and concrete)
 - Insulated aluminum panels: only support foot traffic
 - Flooring varies by weight load (500 to 800 lb/inch²)
 - Option for galvanize steel flooring for increased durability
 - Diamond pattern tread plate available to reduce the risk of slips and falls

²⁹ Also known as a cooler

³² White ceilings may improve brightness.

Refrigerators: Reach-In and Walk-In²⁹

- Plywood underlay: weight load up to 1,000 lb/inch², supports carts and hand truck use
- Reinforced floor: plywood with added tubular or metal grid support inside foam insulation; weight load up to 5,000 lb/inch²; recommended for central kitchen pallet use
- Check for separate plumbing connections and floor drain needs
- May be installed outside of the facility

Pass-thru, reach-in, or roll-in refrigeration

- Exterior materials
 - Stainless steel
 - Anodized aluminum is acceptable on sides if hidden from view
 - Plastic or vinyl finishes
- Option for top or bottom mount refrigeration: condenser and evaporator
- Top mount
 - Maximum interior storage space
 - Lower top shelves for easy access
 - Condenser fan does not pull in floor dust or debris
 - More difficult to maintain and repair due to difficult access
 - Less efficient due to heat rising
- Bottom mount
 - Typically more expensive
 - No stoop bottom
 - Additional storage space on top of the unit
 - Easier to service
 - Risk of condenser fan pulling in floor dust and debris
 - Heat can rise into the cabinet
 - Refrigerant lines run through the back of the cabinet, taking up storage space
- Capacity
 - Single: 20–25 cubic feet
 - Double: 46–52 cubic feet.
 - Triple: 70–80 cubic feet
- Adjustable shelves or slides or roll-in rack
- Note: Slides are typically adjustable but require the use of pans.

²⁹ Also known as a cooler

Refrigerators: Reach-In and Walk-In²⁹

- Full and half doors available (half doors reduce the amount of cold air loss when opened but reduce storage space); determine preferred right or left hinge installation; three hinge doors provide more stability
- Door open alarm
- Combination refrigerator/freezer available

Special features available (may not apply to all types of equipment)

- Adjustable temperature settings
- Automatic defrost
- Condensate disposal system
- Door latch style: latch or magnetic seal (provides tighter close)
- Matching ramps (for roll-in and walk-in)
- Kick plate door protector (walk-in units)
- Digital and analog thermometers
- Hinge: 90° stay open (stay open features also available at 120°, or 180°) (all units)
- Dent-resistant exterior
- Type of equipment legs and option for casters (reach-in units)
- Lighting: shatterproof LED or incandescent bulbs with safety shields (all units)
- Self-cleaning condensers
- HACCP-compatible monitoring and documentation systems which have temperature probes and printing systems to allow product temperature monitoring (sold separately)

²⁹ Also known as a cooler

Steam Jacketed Kettles³³

Description	Steam-jacketed kettles are considered vital to large production institutional kitchens. Steam jacketed kettles are available in various sizes and reduce preparation time due to the ability to cook from the bottom and sides instead of cooking in stock pots on ranges.
Types available	<ul style="list-style-type: none">• Countertop• Floor mount
Intended use	For the preparation of soups, stews, and sauces, as well as a variety of items such as beans and pasta
Specification considerations	<ul style="list-style-type: none">• Interior and exterior material options<ul style="list-style-type: none">▪ 304 and 316 stainless steel<ul style="list-style-type: none">• 316 more durable and better choice for acidic foods• Liner 316 and jacket 304 to control costs• Power (check local regulations for ventilation requirements)<ul style="list-style-type: none">▪ Direct steam (rarely used in school nutrition programs)<ul style="list-style-type: none">• Most energy efficient▪ Electric<ul style="list-style-type: none">• Single-phase and three-phase options• Large-capacity kettles are hard-wired▪ Gas<ul style="list-style-type: none">• Natural or propane options• Capacity<ul style="list-style-type: none">▪ Typically listed in gallons▪ Ranges vary; 40 gallons is the most common in commercial kitchens▪ Common tablet sizes from 5 to 12 gallons in school nutrition programs▪ Headspace requirements: Two to three inches of clearance below the rim is recommended for stirring and avoiding boiling over• Jacket type<ul style="list-style-type: none">▪ Full▪ Two-thirds (most common)

³³ Also known as an SJK

Steam Jacketed Kettles³³

- Other
 - Location of steam jacketed kettle (consider surrounding equipment, the flow of steam, drains, and walkways)
 - Operating pressure: pounds per square inch (psi), 45 to 50 PSU
 - Tilting or stationary bowl with tangent draw-off valve option
 - Electric or manual crank (more labor intensive) tilting available
 - ◊ Evaluate the tilting mechanism for ease of use and cleaning
 - Draw-off valve
 - Sizes vary from one, two, or three-inch diameter or 2.5, 5, or 7.5 centimeters. Consider a larger size valve (two to three inches) so larger pieces of food may be accommodated

Special features available (may not apply to all types of equipment)

- Multiple kettle tables
- Measurement markings
- 90-degree self-locking tilting mechanism
- Kettle-mounted faucet for hot and cold water
- Condensate ring: protects staff from hot dripping condensate when the lid is raised
- Cook/chill discharge valve for efficient transfer to bag-filling equipment
- Shallow bottom design
- Heat deflector shield to protect against burns
- Accessories such as basket insert, mixing arms, pouring lip strainer
- Water faucet for easy filling
- Pasta basket accessory
- Adjustable legs
- Pan support unit for dispensing product
- Temperature controls
 - Digital readout and programming
 - Food cooling
- Clean up kits (brush for draw off tangent)
- Splash guard
- Washdown hose
- Self-diagnostic capabilities

³³ Also known as an SJK

Steamers³⁴

Description Steamers use a closed cavity with moist steam heat at pressures from five to 15 psi to blanch vegetables, cook, and reheat food.

There are three main types of steamers: pressure, pressureless, and connectionless.

Steam via convection comes in direct contact with the food if using pressureless and connectionless units. Cooking times will vary significantly among types of equipment. Steam cooking uses less energy than convection ovens and allows for ideal quality batch cooking of vegetables. Recommend cooking in perforated pans unless solid pans are required (e.g., eggs).

Types available

- Countertop
- Floor

Intended use Blanch vegetables and cook or heat food using steam, which helps food retain its color, moisture, and some nutrients

Size and type considerations The size and type of steam equipment needs vary among school nutrition operations. Use the chart below as guidance.

Size of operation (meals per hour)	Size of steamer
0–200	One single compartment
200–400	One double
400–600	One triple
600–800+	One quadruple or two double

³⁴ See the oven fact sheet for combination steam oven (combi oven).

Steamers³⁴

Specification considerations

- Stainless steel interior and exterior
- Dimensions (height, width, depth)
 - Exterior: actual footprint
 - Interior: pan capacity
 - Operating clearance (left, right, and rear)
 - Door arrangement (right handle or left handle hinge)
- Power supply
 - Gas and electric options are available
 - Direct steam available for pressure and pressureless connected units
 - ◇ Due to direct steam food contact in pressure steamers, a regenerated/steam coil system is required to remove descaling agents, resulting in “clean steam.”
 - ◇ Consider the steam capacity of the boiler to support all pieces of steam equipment
- Water supply
 - Water supply lines and drains required for pressure and pressureless connected units
 - Water manually added to connectionless units
 - Integrated drain water tempering system or aftermarket tempering kit
- Water quality
 - Filtration system recommended
 - Check manufacturer water quality requirements and delimiting recommendations
 - Before purchasing the system, obtain and provide the municipal water report to the filtration company for evaluation and best unit selection to improve performance, minimize maintenance and repairs, and maintain the warranty, or take a water sample at the point of use.

³⁴ See the oven fact sheet for combination steam oven (combi oven).

Steamers³⁴

Specification
by type

Pressure

- Five to 15 pounds psi; cooking temperature 228 °F to 250 °F (includes a pressure safety valve and door locks while compartment is pressurized)
- Fastest cook time
- May use 30 to 50 gallons of water per hour
- Doors do not open during cooking
- Ventilation required
- A filtration system is recommended with regularly scheduled deliming

Pressureless

- Zero psi; cooking temperature 212 °F
- Uses one to three gallons of water per hour
- Doors may open during cooking
- Ventilation required

Connectionless

- Zero psi; cooking temperature 212 °F
- Ideal for facilities without water utilities or drains
- Slowest cook time
- Uses one to three gallons of water per hour
- No scheduled deliming required
- Hood may or may not be required (check local requirements)

Special
features
available
(may not
apply to
all types of
equipment)

- Digital displays and programmable settings
- Timer
- Stand for countertop models
- Storage shelves under the equipment stand
- Split water line connection

³⁴ See the oven fact sheet for combination steam oven (combi oven).

Tilt Skillets³⁵

Description	<p>Tilt skillets operate similarly to cooking on a stovetop or in a steam-jacketed kettle. Units are made with a rectangular griddle bottom, varying volume depths, and a hinged lid with a steam release vent. Skillets may be tilted to drain at a 90-degree angle.</p> <p>Tilt skillets are versatile and work well for various menu items (e.g., grilled sandwiches, ground beef or hamburger patties, pasta, sauteed vegetables, soups, stews, and stir fry). In addition, when combined with boiling water and perforated steam table pans, the unit may be used as a steamer.</p>
Types available	<ul style="list-style-type: none">• Countertop• Floor mount
Intended use	<p>This versatile equipment can boil, braise, grill, sauté, sear, steam, or stir fry various foods.</p>
Specification considerations	<ul style="list-style-type: none">• Material: carbon steel bonded to primarily stainless steel• Power<ul style="list-style-type: none">▪ Gas and electric options▪ Electric: single-phase and three-phase options▪ Gas (natural or propane): required single-phase electric connection<ul style="list-style-type: none">• Varying BTUs range• Controls and thermostat range<ul style="list-style-type: none">▪ Knob and water-resistant electronic controls▪ Temperatures from 100 °F to 450 °F• Location of tilt skillet/braising pan (consider surrounding equipment, drains, and walkways to use and cleanup)• Capacity<ul style="list-style-type: none">▪ 10–60 gallon (30–40 gallon most popular)▪ Countertop sizes available: 10–15 gallon• Water and drain<ul style="list-style-type: none">▪ Consider a water faucet nearby▪ Drain: consider a trench-style drain

³⁵ Also known as a tilting braising pan

Tilt Skillets³⁵

- Tilting
 - Electric or manual tilting
 - Electric tilt: hydraulics or electric with manual override
 - Manual tilt: approximately 30–40 cranks to full-tilt
 - Center trunnion lift: tilts within the footprint; dispenses product closer to the floor
 - Front hinged with lift assist: tilts into the workspace; dispenses product closer to cart height
 - Tabletop typically only manual tilting
 - Identify maintenance requirements for the tilt mechanism

Special features available (may not apply to all types of equipment)

- Locking casters
- Etched or embossed measurement markings
- Tangent draw-off valve
- Strainer attachments
- Pour lip strainer
- Accessories including whisks, spatulas, and spoons
- Pan support for dispensing
- Temperature controls: digital readout, programming
- Clean up kits
- Fill faucet or spray hose
- High-temperature safety cut-off
- Custom stands
- Steam pan insert

³⁵ Also known as a tilting braising pan

Trash Compactors

Description	Schools produce tremendous amounts of garbage. Solid waste may be composed of many products, including cardboard, food, glass, metal, paper, and plastics. As a result, schools often pay large sums of money to have garbage hauled away. Installing a waste compactor can save money by disposing of more garbage per pickup, which lowers the number of waste-hauling visits, thus reducing expenses.
Types available	<ul style="list-style-type: none">• Stationary• Self-contained
Intended use	Commercial and industrial compactors reduce the size and volume of materials, which may lead to cost savings by reducing the number of annual hauls of waste.
Specification considerations	<ul style="list-style-type: none">• Power<ul style="list-style-type: none">▪ Electric HP: single-phase and three-phase options• Hydraulic operating pressure (psi) varies• Capacity<ul style="list-style-type: none">▪ Identify waste in cubic yards, size, and weight of waste in the hopper to identify compactor size and capacity needs• Compaction rate: pounds per hour• Compaction ratio: typically, 3:1 (cut three pickups to 1)• Determine compaction cycle time (critical for dining room compactors and timely customer access)• Safety locking doors
Specification considerations by type	<p>Stationary compactor</p> <ul style="list-style-type: none">• Bolted or welded in place with a removable container• Designed for dry waste: cardboard, paper <p>Self-contained compactor</p> <ul style="list-style-type: none">• Mobile options such as the vertical trash compactor• Designed for liquid or wet waste: leakproof• Reduced odor and access to waste, which may improve insect or rodent infestation issues• Consider the maximum gross weight capacity of the truck. Wet waste is heavier than dry waste (the industry standard is a maximum 35 cubic yard container).

Trash Compactors

Special features available (may not apply to all types of equipment)

- Air sanitizer
 - Auger and chute options
 - Types of equipment legs and options for casters
 - Extra container
 - Heavy-duty lift cart for transporting the compacted trash (full containers can range from 10 to 350 pounds of waste)
 - Tape dispenser (for securing the bag closed)
 - Maintenance kit
 - Trash bags and bag dispensers
 - Drip pan (for very high liquid ratios)
 - Ultraviolet (UV) germicidal unit
 - “Full” indicator/buzzer
-



Chapter Seven

Small Equipment

CHAPTER SEVEN OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- Descriptions and intended use of common small equipment in school nutrition programs
- Different types and special features available
- Specification considerations

Small equipment is typically not a long-term and costly investment. However, writing small equipment specifications helps ensure school nutrition professionals get the desired product at the best price. This chapter provides a list of small equipment by type, identifying general use, specification considerations including potential pros and cons, and special features that may be available. To create the equipment specifications, specification sheets from multiple manufacturers were reviewed and compiled. School nutrition operations are encouraged to use this information as a starting point in writing detailed small equipment specifications.

Blenders

Description Blenders are often used when preparing foods for students needing texture accommodations and for making homogeneous mixtures such as dips, dressings, sauces, and smoothies using frozen ingredients. Blenders require added liquid to operate properly.

It is recommended to test various models using the products and quantity of ingredients planned for preparation to determine the best unit that fits operational needs. For example, some blenders do not work well with small amounts of pureed foods if needed for only one or two servings to accommodate students with special dietary needs. Therefore, depending on the menu offerings, school nutrition operators may need a smaller-sized blender to puree foods for students with special dietary needs and a larger unit or immersion blender for quantity food production.

The wider the container, the more volume is necessary to get the mix to flow appropriately. Further, blenders are rated on HP and RPM. As a rule of thumb, prioritize HP for processing heavy, thick foods and RPM for quickly blending lighter foods.

Types available

- Bowl-style food processor (see mechanical food processor)
- Countertop
- Heated (blends and cooks)
- Immersion (emulsion)
- Vertical chopping machine (see mechanical food processors in this chapter for VCMs)

Intended use A blender is a kitchen tool that uses rotating blades operating at higher RPM to liquefy, mix, or purée foods. Categories of blenders include bar/beverage, culinary, high-performance beverage, and specialty (heated, immersion).

Blenders

Specification considerations

- Material: plastic, stainless steel, and combination
 - RPM: varies among models
 - Blades: type varies by manufacturer, which may be sharp or dull cutting style
 - Jar (also known as a container) material, where applicable
 - Glass, plastic, stainless steel
 - Heavy, tempered glass (see-through)
 - ◇ Break resistant
 - ◇ Durable
 - ◇ Heavy
 - Plastic (see-through)
 - Recommend Bisphenol A (BPA) free units
 - Lightweight
 - May scratch or stain
 - May hold food odors
 - Stainless steel
 - Contents not visible
 - Recommend see-through lid
 - Most durable
 - Jar design options, where applicable
 - Handle
 - Stackable units for storage
 - Measurement graduates
 - Shape: fosters blending motion
-

Blenders

Specification considerations by type

Bar/beverage

- HP: under two HP (designed for under 25 tasks per day)
- Jar capacity: generally 32–64 ounces
- Speed control: typically one, two, or three settings; programmable units available
- Type of control: paddle or toggle, electronic, and programmable
- Lid options: solid or access port for easy addition of ingredients

Culinary/high-performance beverage

- HP: two HP minimum
- Jar capacity may range from 32 ounces to up to four gallons
- Numerous variable speed functions; programmable units available
- Type of control: paddle or toggle, electronic, and programmable
- Lid options: solid or access port for easy addition of ingredients

Specialty (immersion)

- HP varies
- Capacity: consider wand length as capacity depends on the processing vessel and type of food
- Numerous variable speed button functions
- Watertight design to protect the motor
- Other features available: cooling fan to prevent overheating, cordless, detachable power cord, detachable shaft, ergonomic handle, whisk attachment

Special features available (may not apply to all types of equipment)³⁶

- Built-in, in-counter option
- Color-coded jars to prevent allergen cross-contact
- Noise reduction “sound” enclosure (the higher the HP, the noisier the unit)
- Timer
- Non-skid feet
- Memory card slot: allows for custom programming of routinely used settings or blending cycles for specific recipes
- Whipping disks or blades

³⁶ Excluding immersion blenders

Carts and Bun Pan Racks³⁷

Description Carts and racks improve kitchen efficiency and reduce the risk of worker injury due to lifting and transporting.

Types available • Bun pan rack
 • Preparation cart
 • Utility cart

Intended use Storing and transporting food and supplies

Specification considerations • Dimensions
 • Materials
 • Metal: solid or wire options
 • Stainless steel
 • Aluminum
 • Plated (e.g., chrome or other approved substance)
 • Plastic
 • Color options
 • Casters
 • Fully pneumatic (rubber tire filled with pressurized air): for use on sidewalks or driveways
 • Semi-pneumatic (rubber tire with thick walls around a pocket of non-pressurized air): for use on carpet
 • Hard rubber: for use in the kitchen
 • Typical size: five inches (the heavier the item moved, the larger the caster needed)
 • Front and rear separate sizing
 • Locking
 • Heavy-duty ball bearings
 • Swivel and four fixed wheel option
 • Recommend at least two swivel wheels for ease of movement

³⁷ Also known as sheet pan rack or speed rack

Carts and Bun Pan Racks³⁷

Specification considerations by type

Carts

- Weight capacity by cart: individual shelf weight capacity should be determined³⁸
 - Heavy duty: 400–649 pounds
 - Medium duty: 200–399 pounds
 - Standard duty: less than 200 pounds
- Handles
 - Molded-in
 - Removable
 - Vertical
- Shelving
 - Flat, lip, or deep well option
 - Number required
 - Open or enclosed on three sides
 - Spacing between shelves
- Other configurations available: can storage rack, prep table with cutting board, rack dollies for dishware and sheet pans, and utility bowls

Bun pan/speed racks

- Weight capacity varies.
- Shelving options are available to accommodate sheet pans or steam table pans; universal slides accommodate both
- Full and half-size units: an all-welded unit or shipped knock-down style unit
- Open or enclosed with a door latch
- Front, side, and pass-through load option
- Slide widths vary to accommodate sheet and steam table pans
- Stationary or caster options

Special features available (may not apply to all types of equipment)

- Antimicrobial finish (polymer (plastic) carts and racks)
- Bumpers (racks)
- Caster brakes (carts and racks)
- Motorized (carts)
- Oven casters (roll-in units)
- Non-marking/non-marring casters (carts and racks)

³⁷ Also known as sheet pan rack or speed rack

³⁸ For comparison, two cases of #10 cans of tomato sauce weigh 98 pounds.

Colanders and Strainers³⁹

Description	Colanders and strainers have multiple uses in food production. Colanders typically have large holes, and strainers/sieves have smaller holes or mesh.
Types available	<ul style="list-style-type: none">• China cap: a metal mesh cone-shaped strainer with a stainless steel ring and handle often used with a stand to hold it in place<ul style="list-style-type: none">▪ Used to strain stocks, sauces, and soups▪ Ranges in size from 8 inches in diameter and depth to about 12 inches (30 cm) in diameter and depth• Chinois: similar to a China cap but with a finer mesh basket• Spiral skimmer: round, bowl-like screen made of metal at the end of a long handle with a hook on the end for hanging<ul style="list-style-type: none">▪ Typically used to remove or drain food from oil or other liquids• Stand-alone colander with feet or ring base and handles (perforated pans may be used as colanders)• Handheld colander with handles (no feet/ring)• Tamis (drum sieve): shaped like a snare drum, a tamis has a cylindrical edge of wood or metal that supports a disc of metal, nylon, or horsehair mesh and is used with a scraper to push food through the mesh
Intended use	To rinse foods, drain liquid from food, catch and remove smaller pieces of food, and sift foods into smaller pieces or blend dry ingredients.

³⁹ Also known as a skimmer

Colanders and Strainers³⁹

<p>Specification considerations</p>	<ul style="list-style-type: none"> • Size <ul style="list-style-type: none"> ▪ Diameter or dimensions ▪ Volume ▪ Depth (where applicable) ▪ Drain hole diameter • Shape <ul style="list-style-type: none"> ▪ Basket ▪ Conical ▪ Round ▪ Square • Material: aluminum, nickel-plated, plastic or composite, and stainless steel • Mesh material: aluminum, nickel-plated, nylon (plastic), stainless steel • Perforated holes or mesh <ul style="list-style-type: none"> ▪ Double mesh ▪ Extra fine mesh ▪ Fine mesh • Handle length (where applicable) • Dishwasher safe • Weight • Feet or ring base: on colanders only, allows them to sit in a sink for draining
<p>Special features available (may not apply to all types of equipment)</p>	<ul style="list-style-type: none"> • Coated heat-resistant handles (where applicable) • Metal colander <ul style="list-style-type: none"> ▪ Full-ring welded base ▪ Rolled top edge • Strainer/sieve <ul style="list-style-type: none"> ▪ L-shaped hook on one end for stabilization

³⁹ Also known as a skimmer

Cutlery: Knives

Description

Knife selection should coincide with the tasks to perform. Important considerations in knife selection include quality and durability.

Forging and stamping are two standard knife manufacturing methods. Newer technology might also use computer-guided laser beams to cut the blades more precisely.

Forged knives are made when steel is heated, shaped, or compressed with pressure, then finely sharpened with honing and grinding. Forged knives are generally considered stronger and more expensive. Stamped knives are made from a sheet of flat steel and stamped with molds to cut the shapes and sizes of blades and then sharpen.

Types available

• Knife types and descriptions:



- Boning knife: thinner blade (5–6 inches or 13–15 cm long) is used to separate raw meat from bone. Blade may be stiff or flexible



- Bread knife: varies in length (7-10 inches or 17– 25 cm long), scalloped/serrated edge cuts through bread without crushing the soft center. Offset handles are available to keep hands/knuckles out from the food and away from the cutting board



- Carving or slicing knife: 8-12 inches or 20-30 cm long, slightly flexible blade with round/blunt edge, designed for carving dense, cooked meats. Slicing knives are thinner for cutting more delicate cuts of cooked meat



- Chef (French) knife: typically 8-12 inches or 20-30 cm long, available in shorter or longer lengths, pointed edge, slightly curved blade, used for most chopping, slicing, and dicing tasks



- Cleaver: about 4 inches wide (10 cm), used for heavy-duty chopping, including chopping through bones



- Mezzaluna-style knife: double or single blade, 6-8 inches or 15-20 cm with single or double handle, designed to rock back and forth to finely chop or mince herbs and veg-etables (mezzaluna means half-moon in Italian)



- Paring knife: small, 3-4 inches or 8-10 cm long with a sharp tip, used for paring and trimming fruits and vegetables (not ideal for quantity food production)



- Rocker knife: about 20 inches or 50 cm, curved blade designed to cut pizza pies into slices



- Santoku knife (similar to a chef knife): 5-7 inches or 12-17 cm, slightly straighter edge, the tip may be pointed or more rounded than a chef knife

Cutlery: Knives

Intended use Chopping, cutting, garnishing, mincing, and slicing a variety of food products

Specification considerations

- Metal composition of blades/cutting utensils
 - Stainless steel
 - Rust resistant
 - Holds a sharp edge longer
 - Blade edge is harder to sharpen
 - Carbon steel
 - Loses the sharp edge quickly
 - Darkens when in contact with acidic foods
 - Pits and rusts more quickly than other types
 - Easier to sharpen
 - High-carbon stainless steel (commonly used in school nutrition programs)
 - Takes advantage of the best qualities of both metals
 - Keeps the sharp edges longer
 - Rust resistant
- Handle and body composition
 - Available food safe materials: polyoxymethylene (POM – looks similar to wood grain), polypropylene
 - Rivets in the handle should also be checked to make sure that they will hold the tang in place and are completely smooth with the surface of the blade
 - Size and shape of the handle should be comfortable for the user
- Tang length
 - The tang is the unsharpened and unexposed area of the blade that extends into the handle
 - A full tang extends to the end of the handle
 - Provides strength and durability
 - A partial tang does not run the entire length of the handle
 - A rat-tail tang has a thinner tang that runs the length of the handle
 - Found in bargain-priced knives
 - May not be as durable



Cutlery: Knives

- Forged (heated and molded into shape) or stamped blade (cut from a sheet of steel)
- Blade edge: smooth, serrated
- Recesses (also known as a Granton edge): creates air pockets between the blade and food to reduce friction and allowing for a cleaner cut
- Blade flexibility
 - Stiff blades are ideal for cutting through meat, joints, firm fruit rinds, and dense vegetables
 - Flexible and semi-flexible blades are desired when cuts involve shaping the food

Special features available (may not apply to all types of equipment)

- Antimicrobial handles
 - Color-coded handles
 - Storage tools such as block-style, magnetic strip, rack
 - Honing steel required: steel, diamond, or ceramic
 - Blade covers/guards, if storage is unavailable
-

Cutlery: Other

- Description
- Channel knife: used to cut a long, thin strip from citrus fruit
 - Peeler: used to remove the peel or skin from produce
 - Shears: used for snipping/chopping herbs, breaking down meat, especially poultry, and cutting open food packaging
 - Zester: used for obtaining zest from the peel of citrus fruit

Intended use

Cutting, garnishing, peeling, and zesting

-
- Specification considerations
- Material: metal or plastic
 - Metal composition of blades/cutting utensils
 - Handle and body composition
 - Dishwasher safe
 - Ease of cleaning and sanitizing

Special features available
(may not apply to all types of equipment)

- Ergonomic handle (recommended where applicable)

Cutting Boards

Description Cutting boards are widely used in commercial kitchens to protect the knife's edge, improve worker safety, and prevent cross contamination.

Types available

- Bamboo
- Composite
- Plastic
- Rubber or silicone
- Wood

School nutrition professionals should check in with their local health department to see if regulations allow wood cutting boards since they are often more difficult to clean and sanitize.

Intended use Durable board to use in conjunction with cutlery

Specification considerations

- **Material**
 - **Bamboo:** durable, eco-friendly, but not dishmachine safe
 - **Composite:** combined food-safe resin and wood fibers
 - Dishmachine-safe
 - Durable
 - More expensive than plastic
 - **Plastic:** polyethylene or high-density polyethylene
 - Antimicrobial additives
 - Dishmachine-safe: thinner thicknesses may warp in high-heat machines
 - Least expensive
 - Lightweight
 - Susceptible to knife cuts and staining
 - **Rubber or silicone (synthetic rubber)**
 - Danger of warping in high heat dishmachine
 - Knife cuts may be sanded away
 - Non-absorbent
 - Non-slip

Cutting Boards

- Wood: hardwoods (maple) recommended
 - May dull knives faster than plastic
 - Natural antiseptic properties
 - Not dishwasher safe
 - Porous: for food safety, it is best to avoid use with raw meat, poultry, and seafood
- Size: length x width x depth (thickness)

Special features available (may not apply to all types of equipment)

- Color-coded to prevent cross-contact with allergens and cross contamination
 - Custom sizing
 - Hood for easy hanging for drying and storing
 - Mats to prevent slipping
 - Non-skid board corners
-

Environmental Safety Equipment

Description Environmental safety or cleaning equipment is vital to a safe food production facility and is required for HACCP-based food safety programs.

- Types available**
- Brooms
 - Brushes
 - Dustpans
 - Floor mats
 - Garbage cans
 - Sanitizer buckets
 - Mop buckets
 - Mops (wet and dry)

Intended use Used for cleaning materials and spaces in kitchens and cafeterias. Some environmental safety products also help keep employees and others safe (such as wet floor signs and mats).

- Specification considerations by type**
- Brooms**
- Material
 - Style: lobby/traditional and push
 - Bristle type
 - Flagged (splintered bushy ends)
 - ◇ Dry areas
 - ◇ Ideal for dust, granules, and light debris
 - ◇ Smooth floors
 - Unflagged (straight, stiff ends)
 - ◇ Wet areas
 - ◇ Ideal for large debris
 - ◇ Rough/uneven floors
 - Bristle material: horsehair, natural corn fiber, nylon, palmyra natural fiber from palm trees (stiffer), polypropylene plastic, synthetic corn, and Tampico natural fiber from the agave plant
 - Brush cap: holds bristles in place
 - Handle
 - Material: plastic and wood options
 - Length
 - Replaceable
 - Hook for hanging
 - Interchangeable brush heads

Environmental Safety Equipment

Brushes

- Material: nylon, polypropylene, stainless steel, wire (brass)
 - Handle length
 - With or without a scraper
-

Dustpans

- Metal and plastic options
 - Upright with handle and handheld
 - Capacity
 - Ergonomic
 - Lid closure option
-

Mop buckets

- Material
 - Wringer: down press, no-touch, reverse wring, and side press (most common)
 - Built-in drain or pouring spout
 - Capacity/volume: option for clean and dirty water containers
 - Color-coding system, where applicable
 - Non-marking casters
-

Mop

- Length of the mop handle
 - Yarn ply
 - Headband: how the head is attached to the mop handle
 - Absorbency
 - Wet
 - Cut end
 - Looped end
 - Microfiber
 - Dry
 - Cotton
 - Microfiber
-

Environmental Safety Equipment

Floor mats

- Beveled edges
 - Connectable sections
 - Drain holes
 - Grease resistant
 - Reversible
 - Dimensions
 - Thickness
-

Garbage cans

- Size, shape
 - Lids
 - Gallon capacity
-

Sanitizer buckets

- Color-coded for solution identification (blue, green, red, yellow)
-

Knife Sharpener

Description For maximum efficiency and safety, knives should be sharpened when dull. School nutrition staff are more at risk of injury from dull knives than sharpened knives because less pressure needs to be applied, reducing the risk of slipping.

Types available Manual and mechanical sharpeners

Intended use To grind and realign the cutting edge of knives

Specification considerations

Manual sharpener

- Handheld with a non-skid base or handheld with safety guard for sharpening by moving the sharpener down the blade (cutting side up)
- Steel blades
- Blade replacement (some are reversible for extended use)
- Ergonomic polycarbonate handle
- Serrated knife sharpeners available

Note: School nutrition professionals trained in the use of a sharpening stone may consider using a whetstone for manual sharpening.

Mechanical sharpener

- 120 to 230 volts
 - Single, two and three-stage sharpening options
 - Stropping wheel option (operates in reverse direction for blade polishing)
 - Grinding wheel (may be replaceable)
 - Serrated knife sharpeners are available
 - Magnetized drawer to capture metal shavings available
 - Grinding wheel material is typically aluminum oxide
-

Manual Food Preparation Equipment

Description	Various manual smallware equipment is available to assist in food preparation. These units are labor-saving and improve food quality and consistency.
Types available	<ul style="list-style-type: none">• Cheese dicer/slicer• Chopper/dicer• Fry cutter• Grater• Juicer• Pineapple corer• Potato and sweet potato cutter• Salad spinner• Slicer and egg slicer• Spiral slicer• Wedger
Intended use	Manual food preparation equipment is commonly specific to processing one food item or several foods into one cut (e.g., wedges).
Specification considerations	<ul style="list-style-type: none">• Material: stainless steel and plastic options• Blade types vary: perforated, serrated, or smooth• Anticipated shelf life of blades• Replacement blades available• Ease of disassembly for cleaning and sanitizing• Ease of assembly and use: blades, feeding tube, plunger, or pusher head• Dishwasher safe (corrosion resistant)• Maintenance requirements such as food grade lube: Pan spray should not be used as lube as it draws pests and degrades the equipment.• Capacity: product produced per hour• Cleaning tools may be sold separately• Worker safety features• Accessories: cover

Manual Food Preparation Equipment

Special features available (may not apply to all types of equipment)

- Accessory storage rack
- Blade types
 - Angled, rotating in dual directions, serrated, smooth
- Disc types
 - Dice: various sizes available
 - Grate or shred
 - Julienne
 - Slice: multiple styles and thicknesses are available
 - Brunoise⁴⁰
 - French fry
 - Julienne
 - Waffle
 - Whip
- Feet
 - Retractable wheels
 - Rubber
 - Suction cup
- Noise reduction technology
- Other accessories
 - Cleaning tools
 - Cover
 - Stand
- Plastic-coated handles for comfort
- Sealing system for liquids
- Timer

⁴⁰ A brunoise is a cube cut from julienne sticks that a chef quarters and dices again, producing cubes that are $\frac{1}{8}$ by $\frac{1}{8}$ by $\frac{1}{8}$ inches.

Mechanical Food Processors

Description	<p>Food processors are used to provide consistency, decrease product waste, and speed up food production. Food processors do not require added liquid to operate properly. Food processors can chop, dice, emulsify, grind, grate, puree, shred, or slice food. Some food processors may help prepare foods with textural modification to accommodate students with special dietary needs.</p>
Types available	<ul style="list-style-type: none">• Bowl-style with a closed bowl (includes buffalo chopper, cutter/mixer)• Combination with interchangeable heads from bowl to chute or continuous-feed or chute-style• Vertical chopping machine – vertical cutter mixer
Intended use	<p>Mechanical processing equipment may be used to chop meat and cheese and prepare fresh produce, dips, dressings, and sauces. Food processors typically operate at lower RPM than blenders. Therefore, depending on the menu and volume needs, school nutrition professionals may need to purchase blenders and mechanical food processors.</p>
Specification considerations	<ul style="list-style-type: none">• Material: aluminum, plastic, stainless steel, and combinations• RPM varies among models (the higher the RPM, the less precise the cut)• Blades and disks vary by desired cut or process• Belt (bowl sits away from motor) or gear (bowl sits over motor) driven• Capacity: see manufacturer capacity charts• Dishwasher safe• Cleaning tools may be sold separately• Dimensions and footprint of equipment• Ergonomic design for continued use• Speed control: on, off, pulse (variable speeds available on some models)• Type of control: buttons and knobs• Worker safety features and locks

Mechanical Food Processors

Specification considerations by type (may not apply to all types of equipment)

Bowl-style

- HP: typically under two HP
 - Higher RPM for emulsifying or pureeing foods
 - Lid options: see-through
 - Jar: plastic and stainless steel (scraping arm and lid wiper available)
-

Combination

- HP: typically under three HP
 - High RPM for emulsifying or pureeing and lower RPM for chopping and slicing are available on some models
 - Lid options: see-through
 - Various feed or chute heads are available
 - Jar and chute head: plastic and stainless steel options (chute/continuous head opening options include full opening, partial opening, and small round chute opening for cylinder-shaped foods only)
-

Continuous feed/chute-style

- HP: typically two HP and under (some models require a three-phase electrical connection)
 - Lower RPM for a more precise cut
 - Chute/continuous head opening options include full opening, partial opening, and small, round chute opening for cylinder-shaped foods only
 - Recommend accompanying stand for optimal work height to reduce risk of repetitive use injury.
-

Vertical Cutter-Mixer

- HP varies from five to 16 HP motor
 - Typically three-phase (identify HP needed to prepare the dough, where applicable)
 - Various bowl capacities are available
 - Multiple speeds are available, plus a pulse or “jog” control button for bursts of quick action
 - Bowl tilt
 - Blades designed for chopping, grinding, kneading dough, pureeing
 - Removable bowl
-

Mechanical Food Processors

Special features available (may not apply to all types of equipment)

- Accessory storage rack
- Blade types (bowl type, VCM)
 - Angled, rotating in dual directions, serrated, smooth
- Disc types (continuous feed or chute)
 - Dice: various sizes available
 - Grate or shred
 - Julienne
 - Slice: multiple styles and thicknesses are available
 - Brunoise⁴¹
 - French fry
 - Julienne
 - Waffle
- Noise reduction technology
- Plastic-coated handles for comfort
- Sealing system for liquids
- Timer

⁴¹ A brunoise is a cube cut from julienne sticks that a chef quarters and dices again, producing cubes that are $\frac{1}{8}$ by $\frac{1}{8}$ by $\frac{1}{8}$ inches.

Mixing Bowls

Description Commercial, stainless steel mixing bowls are available in various sizes, from small, less than 1 quart, to up to 80-quart bowls designed to accompany mobile mixing bowl stands.

Types available

- Mixing bowls in various sizes
- Mixing bowls with silicone bottoms to prevent slipping

Intended use Mixing, kneading dough, and whisking

Specification considerations by type

Mixing bowls

- Stainless steel – gauge varies
- Capacity/volume in quarts
- Compatible lids
- Degree of slope for sides of the bowl (wide or narrow)
- Bowls of descending volume may be nested/stacked for compact storage

Special features available (may not apply to all types of equipment)

- Rolling stands for larger mixing bowls
- Volume indicated on bowl

Pots and Pans

Description The type and gauge of material will affect the durability, weight, beauty, and cost of pots and pans. Aluminum, stainless steel, and iron are institutional kitchens' most common pot and pan materials. Non-stick coatings are available. In addition, the metal should be able to distribute heat evenly and uniformly, lightweight enough to allow for easy handling, and durable for long-term use. Steam table pans are available in regular and heat-resistant polycarbonate and stainless steel.

Types available

- Baking pan
- Bun/cake pan
- Double boiler
- Dutch oven
- Grill pan
- Roasting pan
- Rondeau⁴²
- Saucepan
- Sauté pan
- Sheet pan
- Steam table pan
- Stockpot

Intended use Baking, braising, cooking, grilling, roasting, and steaming of food

Specification considerations by type

Pots and pans

- Cookware material options
 - Aluminum (pots, pans, and bun and sheet pans)
 - Available in varying sizes/capacities and thicknesses (gauge)
 - Lightweight and easier to lift
 - Good heat conductor
 - Not as durable due to metal softness
 - Reactive with acidic foods (aluminum may leach into the food, imparting a metallic taste and pitting the cookware)
 - Rolled edged for sheet pans
 - Rust and pitting from high concentrations of chlorine
 - Stainless steel (pots, pans, sheet pans, steam table pans)
 - Available in varying sizes/capacities and thicknesses (gauge)
 - Not as good a heat conductor as aluminum
 - Aluminum-clad bottom available to improve heat conduction
 - Rust and pitting from high concentrations of chlorine

⁴² A rondeau pan is used for searing, braising, oven-roasting, frying, poaching, pan-roasting, and simmering or boiling. It is similar to a stock pot but not as deep.

Pots and Pans

- Very durable
- Rolled edges for sheet pans
- Better for use with acidic foods
- Polycarbonate (steam table pans)
 - Available for hot and cold applications
 - Available in varying sizes/capacities
 - High heat resistant (amber and black color options)
 - Less heat conductivity
 - Easier to change serving line pans—they do not get as hot as stainless steel, making it easier to lift and move
- Iron (pots and pans)
 - Available in varying sizes/capacities
 - Inexpensive
 - Good heat conductor
 - Cracks and rusts easily
 - May be used with induction cookware
 - Very heavy and harder to lift
 - Need to check local health code regulations regarding the use of iron
- Cookware thickness (gauge or millimeter)
- Non-stick coatings available
- Shape of the pan (round, rectangular, square, muffin, bundt)
- Handle Construction
 - One-piece construction, riveted or welded
 - Coated for safety
 - Color-coded to prevent cross-contact with allergens
- Induction compatible, where desired (made of magnetic stainless steel, cast iron, or nickel)
- Dishwasher safe
- Compatible lids
- Lined bottom/base (pots and larger pans such as roasting and braising)

Special features available (may not apply to all types of equipment)

- Hanging racks for pots and pans
 - Strainer that fits in the pot
-

Personal Protection Equipment

Description	Worker safety through the proper use and care of personal protection equipment (PPE) is required by the OSHA regulations and should be included in food safety plans and procedures.
Types available	<ul style="list-style-type: none">• Aprons• Gloves• Goggles• Oven mitts/sleeve and potholder• Safety/cutting gloves⁴³
Intended use	Equipment worn or used to minimize exposure to hazards that could cause workplace injuries and illnesses
Specification considerations by type	<p>Aprons</p> <ul style="list-style-type: none">• Material: canvas, cotton/polyester, disposable plastic, heat resistant Neoprene®, and vinyl• Style: bistro, bib, cobbler, dishwasher, four-way• With or without pockets• Launderable <hr/> <p>Gloves</p> <ul style="list-style-type: none">• Material: latex,⁴⁴ nitrile rubber, rubber (designed for cleaning, reusable), thermoplastic elastomers (TPE), or vinyl• Breathable• Puncture-resistance• Sizes available• Tactile sensitivity <hr/> <p>Goggles (eye protection)</p> <ul style="list-style-type: none">• Material• Framed and frameless <hr/> <p>Oven mitts/sleeve and potholder</p> <ul style="list-style-type: none">• Material: cotton, Kevlar®, Neoprene®, silicone• Commercial-duty• Dimensions/size• Temperature range• Ambidextrous (for gloves)• Launderable or dishwasher safe

⁴³ Gloves providing cut protection should be used when cutting any type of food product with tools such as a knife or slicer.

⁴⁴ Check to see if latex is allowed in your state. Latex is banned in some states to prevent accidental exposure, as it can be an allergen for some people.

Personal Protection Equipment

Safety/cutting gloves

- Material: woven fabric blends and stainless steel
- Launderable or dishwasher safe
- Sizes available

Special features
available by
type

Goggles

- Anti-fog
- Anti-scratch
- Contoured temples
- Integrated side-shields
- Large enough to slide over prescription glasses
- Lens tint
- Molded nose bridge
- Splash protection
- Wraparound design

Oven Mitts/Sleeves/Potholders

- Antimicrobial additions
- Flame/heat/steam resistant
- Non-slip textured
- Non-stick
- Pre-shrunk
- Wrist strap

Safety/cutting gloves

- Antimicrobial
 - Pre-shrunk
-

Scales and Weighing Equipment

Description	<p>Scales are considered more accurate than volume-measuring equipment. Select the capacity needed based on the heaviest food item to be weighed during receiving, preparing, or serving. For example, a digital portion scale with a maximum weight of 10 pounds cannot be used to weigh a 25-pound case of fresh tomatoes.</p> <p>Legal for trade scales are only required for operations that package or repackage goods to be sold by weight. Legal for trade indicates that the scale has undergone testing to ensure accuracy and meets all government standards. These scales have an NTEP (National Type Evaluation Program) approval with a valid certificate of conformance number.</p>
Types available	<ul style="list-style-type: none">• Baker/balance• Portion and receiving (analog/mechanical and digital)
Intended use	Used to determine the most precise weight (mass) of a food or object
Specification considerations by type	<ul style="list-style-type: none">• Material: coated metal (typically not for food contact), enamel, stainless steel• Power source<ul style="list-style-type: none">▪ Digital: battery, electrical (single-phase), or both▪ Analog/mechanical: spring• Display (not applicable to baker/balance scales)<ul style="list-style-type: none">▪ Digital: connected LCD or LED or Bluetooth® wireless (on some models)<ul style="list-style-type: none">• Automatic shutoff• Backlit• Computer/printer connection• Greater precision (ideal for determining portion weight and serving disher/scoop/spoodle, etc.)• Tare and tare and hold display weight feature⁴⁵• Rechargeable batteries• Remote: may be wall mounted; ideal for large items that may reduce the visibility of the readout (e.g., pizza, steam table pans)• Unit (imperial and metric)• Waterproof available• Available as a receiving scale used in the receiving and loading dock area for bulk weighing during deliveries (25 lb case of tomatoes)

⁴⁵ To tare a scale means to zero out the weight of whatever was already on the scale.

Scales and Weighing Equipment

- Analog/mechanical
 - Air dashpot/damper: reduces spring-related shock and vibration of the indication pointer
 - Fixed or rotating dial
 - Unit (imperial and metric)
 - Available as a receiving scale used in the receiving and loading dock area for bulk weighing during deliveries (25 lb case of tomatoes)
- Easy to clean
- Portability
- Size of the weighing platform
- Shatterproof
- Weight capacity
 - Analog and digital: identify weight increment readings
 - Baker/balance: imperial and metric calibrated weight sets available; scale uses a poise and scale beam to determine the weight of the product

Special features available (may not apply to all types of equipment)

- Additional display options:
 - Backlight
 - Humidity reading
 - Remote: may be wall mounted; ideal for large items that may reduce the visibility of the readout, e.g., pizza, steam table pans
 - Shatterproof
 - Dishwasher safe
 - Compact platform
 - Platform covers
 - Receiving scale only
 - Dolly
 - Ramp
 - Weighing platform close to the ground
 - Removable bowl in place of the platform
 - Suction cup feet to secure the scale to the counter
 - Tare and hold
 - Waterproof
-

Slicers

Description	Slicers are designed to cut high-volume amounts of meat, cheese, and produce quickly and efficiently. Models may be operated manually or mechanically. Blade sharpeners may be built-in. Consider safety and ease of assembly and disassembly for cleaning and sanitizing.
Types available	<ul style="list-style-type: none">• Automatic, sometimes referred to as semi-automatic• Manual slicers
Intended use	For consistent portion control of meats, cheeses, produce, and other foods
Specification considerations	<ul style="list-style-type: none">• Material: burnished aluminum, plastic, stainless steel• Size of receiving platform for sliced product• Type of feet: metal pegs, rubber grommets, and suction cups• Type of on/off switch<ul style="list-style-type: none">▪ Toggle switch, digital, moisture-proof
Specification considerations by type	<p>Automatic/Semi-automatic</p> <ul style="list-style-type: none">• Heavy and medium duty options: heavy duty is ideal for large batches requiring over five minutes of continuous slicing (deli meats, tomatoes)• Belt or gear driven• Disengage for manual operation• HP: ½ HP• Knife diameter: 12–14 inches, with 12 inches being the most common size• Knife sharpener <hr/> <p>Manual</p> <ul style="list-style-type: none">• Light duty: ideal for minimal use; not recommended for slicing cheese• Knife diameter: 9–10 inches• Mandoline only<ul style="list-style-type: none">▪ Interchangeable blades▪ Safety handle▪ Thickness adjustment feature
Special features available (may not apply to all types of equipment)	<ul style="list-style-type: none">• Safety features include interlocks to prevent the slicer from being turned on if the carriage is removed, knife guards, magnetic contacts for guards, and a no-volt release that requires a power button to be pressed to restart after the unit is unplugged• Accessories such as covers, chutes (produce), and debrief deflectors• Digital portion scale on receiving platform

Slicers

- Sidearm lift for easy cleaning underneath
 - Mandoline only
 - Julienne blade
 - French fry blade
 - Slip-resistant
-

Spatulas and Whisks

Description Spatulas and whisks are available in various shapes and are selected based on the task. Spatula blades may be perforated, slotted, or solid. Spatulas and some whisks are made of rubber polyethylene or polypropylene that melts when exposed to high heat. Heat-resistant silicone (synthetic rubber) options are available.

Types available



Spatulas

- Baking/icing
- Flat
- Off-set
- Pie server
- Spoonulas



Whisks

- Balloon/piano
- Ball/kettle
- Conical
- Dough
- Flat/roux
- French
- Spring/spiral/coiled

Intended use by type

Spatulas

- Baking/icing: off-set style; used to ice cakes, cookies, cupcakes, or other baked goods
- Flat: mix, stir, or remove food from a vessel
- Off-set: turn food over in a pan or skillet during preparation; it may also be used for service
- Pie: serve pie
- Spoonulas: scoop and scrape the sides of bowls, pots, or other cooking vessels

Spatulas and Whisks

Whisks

- Balloon/piano (thin wires with a bulbous end): lightly mixing and whipping
- Ball/kettle (long handle with a cage-like ball at the end): breaking up ground beef in a kettle or tilt skillet, mixing sauces or soups
- Conical (thin wires with stiff construction forming a diamond shape): mix ingredients, designed to reach ingredients caught in corners of pots and pans
- Dough (flat profile with outer and inner circle): handling dough or batters without overworking the ingredients
- Flat/roux (typically four wires in a flattened balloon shape): scraping the bottom of the pan, prepare roux or gravies; remove poached eggs or fish from liquid
- French (thicker wires than a balloon with a bulbous end; most common and versatile): forming emulsions, mixing batters and sauces
- Spring/spiral/coiled (single wire wrapped in spring, spiral and coiled shape): mixing gravy, sauces, salad dressings, angled head allows for better contact with the bottom of the pan

Specification
considerations
by type

Spatula

- Material
 - Food contact surface
 - Nylon: melting point of about 400 °F
 - Plastic: polypropylene (stronger) and polyethylene melting point of about 390 °F
 - Rubber: melting point of about 350 °F
 - Silicone: melting point of about 570 °F
 - Stainless steel: melting point of 2500 °F to 2790 °F depending on its exact composition
 - Handle
 - Nylon
 - Plastic
 - Rubber
 - Silicone
 - Stainless steel
 - Wood: not recommended; unable to properly clean and sanitize
- Length of unit
- Width and length of the blade
- Curved (spoon), solid or slotted blade
- Flexibility of the blade (not applicable to metal spatulas)

Spatulas and Whisks

Whisk

- Material
 - Handle
 - Nylon (melting point of about 400 °F)
 - Chrome-plated stainless steel
 - Silicone
 - Stainless steel
 - Loops
 - Nylon (use with non-stick cookware)
 - Silicone (use with non-stick cookware)
 - Stainless steel
- Handle length
- Ergonomic handle
- Knobs on the handle to prevent slipping

Spatula

- Ergonomic handle
- Notched to clean mixer paddle attachment blade
- Rounded corners on metal spatulas to prevent puncturing the food

Special features available (may not apply to all types of equipment)

- BPA Free, where applicable (spatulas)
 - Dishwasher safe
 - Hanging loop on handle
 - Stain and odor-resistant (spatulas)
-

Other Hand Tools

Description Small equipment such as bench scrapers, can openers, and mixing spoons provide school nutrition professionals with the hand tools necessary for food production.

- Types available**
- Bench scraper/dough cutter⁴⁷
 - Can opener
 - Hand grater
 - Mixing spoons

Intended use by type Variety of tasks to simplify food preparation

- Specification considerations**
- General specification considerations
- High heat resistance, where applicable
 - Dimensions of the hand tool
 - Weight of the hand tool
 - Shape and size of the hand tool

- Specification considerations by type**
- Bench scraper**
- Styles: plastic, stainless with polycarbonate handle, stainless with seamless rolled edge handle
 - Option for measurements
 - Polycarbonate handles available in color coding

Can opener

- Electric
 - Single (4-7 #10 cans per minute) and two-speed (5-8 #10 cans per minute) options
 - Two-speed is better designed for opening multiple can sizes
 - Voltage: 115 and 230
 - Tabletop
 - Heavy-duty options available
 - Lock down bracket option
- Manual
 - Crank handle
 - May operate with a variety of can sizes
 - Recommend at least one unit in case of an electrical outage
 - Mobile, table mount, and wall mount are available

⁴⁷ A bench scraper is a blunt-edged rectangular metal blade. This scraper has many uses, such as cutting up brownies and bar cookies, portioning out dough, scraping bits of dough or other food pieces off of a cutting board, and lifting vegetables off a cutting board and dropping them into a pot.

Other Hand Tools

Grater

- Box or rotary style (hand grater with handle)
 - Collection container attachment
 - Grate size/style (course, fine, zest, ribbon, shave)
-

Mixing spoons

- Solid or slotted
 - Handle lengths vary
 - Materials available: stainless steel, high-heat nylon
 - Polycarbonate handles available for stainless steel spoons
 - Hooked handle for hanging storage
-

Special features
available
(may not apply
to all types of
equipment)

- Ambidextrous
 - Dishwasher safe except for electrical items
-

Storage Containers

Description Storage containers that may be washed, rinsed, and sanitized provide an efficient and safe method of storing food and supplies.

Types available

- Ingredient bins
- Plastic serving and storage containers

Intended use Safe storage of dry, frozen, and refrigerated food

Specification considerations

- Material
 - Polycarbonate (clear)
 - Polyethylene (white)
 - Polypropylene (translucent)
 - Styrene acrylonitrile
- BPA free
- Dishwasher safe
- Freezer safe
- Temperature range for holding
 - Polyethylene and polypropylene: - 40 °F to 160 °F
 - Polycarbonate: - 40 °F to 210 °F
- Proper fitting lids
- Size, shape, and volume requirements
- Stain and odor-resistant
- Stackable

Special features available
(may not apply to all types of equipment)

- Microwave safe
- Measurements labeled on the container
- Casters and dollies for ingredient bins
- Color-coded lids
- Storage container shape
 - Round containers cool foods faster than square due to circulation
 - Square containers maximize available storage space

Thermometers

Description	Thermometers are required to document safe food and equipment temperatures.
Types available	<ul style="list-style-type: none">• Bi-metal oven or warmer• Bi-metallic stemmed• Digital• Disposable• Infrared• Thermocouple
Intended use	Accurate temperature reading of dry, frozen, and refrigerated foods during receiving, storing, preparing, cooking, serving, cooling, and transporting
Specification considerations by type	<p>Bi-metal oven or warmer</p> <ul style="list-style-type: none">• 100 °F to 600 °F dial• Stainless steel• Standing and hanging <hr/> <p>Bi-metallic stemmed</p> <ul style="list-style-type: none">• Accurate to + or – 2 °F• Available in bimetal for hot food equipment use• Requires regular calibration schedule• Sensing area: tip to indentation or dimple• Dishwasher safe <hr/> <p>Digital</p> <ul style="list-style-type: none">• Accurate to + or – 2 °F• Temperature range: minus 40 °F to 50 °F to over 500 °F (models vary)• Ability to be recalibrated• 1.5 mm thin tip available• Dishwasher safe available <hr/> <p>Digital (thermistor-style)</p> <ul style="list-style-type: none">• Auto-off• Highly accurate temperature range: - 40 °F to 50 °F to over 500 °F (models vary)• Instant LCD read (within 10 seconds)• Ability to be recalibrated• 1.5 mm thin tip available• Dishwasher safe available

Thermometers

Disposable indicators

- Use only once for approved food or task
 - Not able to calibrate
-

Infrared

- Measures surface temperature only
 - Ideal for receiving foods
 - Accurate to + or – 4 °F (models vary)
-

Thermocouple

- Highly accurate temperature range (models vary)
 - Instant read (within two to five seconds)
 - Multiple probe options
 - Ability to be recalibrated
 - Dishwasher safe available
-

Special features available (may not apply to all types of equipment)

- Ability to switch between Celsius and Fahrenheit (digital and thermocouples)
 - Alarm
 - Antimicrobial
 - Color-coding (digital, bi-metallic stemmed)
 - Dishwasher safe
 - Display backlight (digital, infrared, thermocouple)
 - Heat resistant
 - Magnetic housing
 - Temperature recall features (digital, thermocouple)
 - Wall mounts/storage clips
 - Waterproof or water-resistant
-

Utensils and Trays

Description	<p>Choosing permanent ware such as dishes, trays, or flatware requires careful consideration. Permanent ware is handled extensively and must be carefully cleaned and sanitized thousands of times over its lifetime. Permanent ware may be considered the best choice in some operations because it is environmentally friendly.</p> <p>In other operations, disposables may be a cost-effective and environmentally friendly choice when recycling and composting are used. For example, disposables may be used if a site is short-staffed or in a situation where permanent ware is unsuitable (e.g., field trips) or the safest option.</p>
Types available	<ul style="list-style-type: none">• Flatware (forks, knives, spoons, sporks)• Trays (multiple compartment or open tray)
Intended use	Service
Specification considerations by type	<p>Flatware</p> <ul style="list-style-type: none">• Material: disposable or metal<ul style="list-style-type: none">▪ Metal: chromium and nickel: 18% chromium and the percentage of nickel added varies▪ 18/10 (maximum rust resistant), 18/8 (slightly rust resistant) and 18/0 (not rust resistant)▪ Stainless steel with the highest amount of nickel provides the greatest resistance to rust <hr/> <p>Trays</p> <ul style="list-style-type: none">• Material: fiberglass, melamine (contains metal), and plastic (acrylonitrile butadiene (ABS), polypropylene)• Compartments• Four, five, or six compartments with flatware holders on the right or left side• Open tray<ul style="list-style-type: none">▪ Flat▪ Multiple shapes available• Dishwasher safe• Insulated tray options• Color options• Scratch-resistant surface available• Rounded corners for easy cleanup

Utensils and Trays

Special features available (may not apply to all types of equipment)

- Chlorine-safe, where applicable (depends on municipal water source)
 - Insulated trays
 - Lids for trays
 - Specialty carts/boxes for transporting trays (when in use)
 - Color options
 - Scratch-resistant surface
 - Trays with rounded corners for easy cleanup
-

Volume Measuring Equipment

Description Accurate and quick recipe preparation and portioning of food require volume measurement tools. For additional information, refer to the Institute of Child Nutrition’s Basics at a Glance Poster.

- Types available**
- Dishers or scoops
 - Dry and liquid measuring cups
 - Ladles
 - Measuring spoons
 - Spoodles

Intended use Accurate and consistent ingredient or service portioning of food

Specification considerations Material: aluminum, plastic (polycarbonate), high-heat nylon, and stainless steel

- Specification considerations by type**
- Dishers/scoops**
- Volume of the scoop: the number corresponds to the number of scoops per quart
 - Serving option: squeeze-style for right or left-handed or thumb trigger

Dry and liquid measuring cups and spoons

- Clear or translucent is recommended for liquid (except glass)
- Metric and imperial units available

Ladles

- Volume of ladle

Spoodles: cross between a spoon and a ladle

- Volume of spoodle
- Solid or perforated/slotted available

- Special features available by type**
- Dishers/Scoops**
- Color-coded to denote portion size

Dry and liquid measuring cups

- Lip to aid when pouring
- Easy to grip handle
 - Molded-in handle
- Embossed graduations or engraved measuring lines
- Measurement lines with the corresponding numbers (e.g., 1, 1 ½, 2, 2 ½ as units with cup only measure and three lines for ¼, ½, and ¾ are harder for staff to understand)
- Freezer safe
- High-heat resistant

Volume Measuring Equipment

Ladles

- Handle
 - Coated
 - Hook at the end for storage
 - Measurements on ladle bowl
 - Bowl designed to reduce spillage
-

Spoodles

- Color-coded to denote portion size
 - Counter rest “knob” on the handle
 - High-heat resistant
-



Chapter Eight

Getting Ready for the Procurement Process

CHAPTER EIGHT OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- Ethical considerations in procurement
- Key Federal regulations for procurement
- The required steps for informal and formal procurement processes and noncompetitive procurement
- Guidelines and best practices for writing specifications

The procurement process provides the course of action school nutrition professionals and purchasing agents follow to legally purchase and receive foodservice equipment that accommodates the menu and food production methods in school nutrition programs. This chapter only addresses equipment procurement. The services of architects and kitchen consultants are more nuanced than equipment procurement and are not covered in this manual.

The procurement process determines the final equipment selection. Equipment procurement is a complicated, multi-step process with many ethical and regulatory parameters that must be adhered to. The following chapter provides guidance and information to make successful decisions during the equipment procurement process. Each school district's processes may vary based on local and State procurement regulations.

Ethical Considerations

Maintaining free and open competition is key to effective and legal bids and is required by State and Federal law. Since school nutrition programs are Federally funded, school nutrition professionals and staff must be completely aware of ethical concerns and avoid actions that jeopardize the program or their positions of authority. School nutrition professionals must follow local, State, and Federal ethics rules when procuring for their program. The school nutrition professional is responsible for communicating, documenting, and monitoring procurement processes to protect the integrity and interests of the school nutrition program. Procurement reviews help validate ethical purchasing practices. If school nutrition professionals have any doubts or questions about what is expected of them, they should consult their local purchasing department and State agency.

School nutrition professionals are public sector employees and are expected to make decisions based on benefits to the program, not to themselves. Per the USDA (2014), school nutrition programs must maintain a written code of standards of conduct governing the performance of their employees engaged in the award and administration of contracts. At no time should a school nutrition professional allow or participate in improper actions such as:

- Showing preference based on personal relationships
- Accepting gifts, cash, gift cards, free trips, or entertainment from a vendor
- Showing a preference for certain suppliers due to pressure from district administration or political connections
- Sharing a vendor's cost information with another vendor before vendor selection
- Failing to divulge personal interest (e.g., a relative who works for a company) or business interests (e.g., part ownership in a company)

Regulations

The school nutrition professional needs to know the local, State, and Federal laws related to equipment procurement and where to go for additional information. The USDA Code of Federal Regulations (CFR) contains specific directions that school nutrition professionals and others involved in the procurement process must follow to comply with the law. The following regulations within 2 CFR 200 provide essential guidance during the bid development and procurement process (see Table 17).

Table 17

Key Federal Regulations for the Procurement Process

Regulation	Description	Compliance
Conflict of Interest 2 CFR §200.112	Establishes conflict of interest policies for Federal awards	<ul style="list-style-type: none">• Disclose, in writing, any potential conflicts of interest
General Procurement Standards 2 CFR §200.318(a)	The school district must have and use documented procurement procedures consistent with State, local, and tribal laws and regulations for purchases under a Federal award or sub-award.	<ul style="list-style-type: none">• Comply with all Federal, State, and local regulations, whichever is most restrictive
Code of Conduct 2 CFR §200.318(c)(1)	The school district must maintain written standards of interest and performance of its employees engaged in the selection, award, and administration of contracts. No employee, officer, or agent may participate in the selection, award, or administration of a contract supported by a Federal award if they have a real or apparent conflict of interest.	<ul style="list-style-type: none">• Refuse gifts or gratuities; anything that would be a personal benefit to the recipient• Maintain a written code of conduct• Maintain appropriate documentation, including:<ul style="list-style-type: none">▪ The rationale for the method of procurement▪ The selection of contract type▪ Contractor selection and rejection▪ The basis for the contract price• Maintain compliance throughout the procurement process

Regulation	Description	Compliance
<p>Competition 2 CFR §200.319</p>	<p>To ensure objective contractor performance and eliminate an unfair competitive advantage, contractors who develop or draft specifications, requirements, statements of work, or invitations for bids or requests for proposals must be excluded from competing for such procurements. Situations considered to be restrictive of competition include specifying only a “brand name” product instead of allowing “an equal” product to be offered and describing the performance of other relevant requirements of the procurement. Clear and accurate descriptions of technical requirements for procuring the item must not contain features that unduly restrict competition. When it is impractical or uneconomical to make a clear and accurate description of the technical requirements, a “brand name or equivalent” description may be used.</p>	<ul style="list-style-type: none"> • Promote free and open competition • Avoid the following: <ul style="list-style-type: none"> ▪ Placing unreasonable requirements to quality to do business, such as delivering equipment only in the month of August ▪ Requiring unnecessary experience or excessive bonding, such as a \$5 million bond, when a \$1 million bond would suffice ▪ Using noncompetitive pricing practices between companies, such as a company setting unrealistically low prices to win a bid ▪ Allowing organizational conflicts of interest, such as giving preference to a relative of a school board member ▪ Specifying a brand name product only without allowing an “equal” product to be offered, which eliminates fair and open competition • Write selection procedures that: <ul style="list-style-type: none"> ▪ Do not unduly restrict competition ▪ Identify all bidder requirements ▪ Ensure that all prequalified lists of persons, firms, or products that are used in acquiring goods and services are current ▪ Avoid disqualifying potential bidders during the solicitation period ▪ Disallow contractors involved in the development of specifications from bidding on equipment

Regulation	Description	Compliance
Methods of Procurement to be Followed 2 CFR §200.320	<p>The school district must have documented procurement procedures. The types of procurement methods include:</p> <ul style="list-style-type: none"> • Informal procurement methods, which include micro-purchases and small purchases • Formal procurement methods, which include sealed bids and requests for proposals • Noncompetitive procurement for unique or emergency procurement purposes 	<ul style="list-style-type: none"> • Make equipment purchases by one of five procurement methods: <ul style="list-style-type: none"> ▪ Micro-purchase ▪ Simplified acquisition threshold, formerly known as small purchase procedure ▪ Invitation for bid (IFB)/sealed bids ▪ Requests for proposals (RFP)/competitive proposals ▪ Noncompetitive proposals (needs prior approval from the State agency and is rarely allowed)

Price-Fixing and Bid-Rigging

School nutrition professionals need to be alert for potential price-fixing and bid-rigging by manufacturers or equipment brokers. Price-fixing is a scheme between competitors to maintain a specific pricing level instead of allowing the price to be determined by market forces and is illegal under antitrust laws. As a result, the price is inflated, and the school district is over-charged. Bid-rigging occurs when competitors agree in advance who will submit a winning bid or take turns as a winning bidder. The lack of bids from expected competitors may be a sign of bid-rigging. School nutrition professionals should provide any evidence of fraud or allegations against vendors from other vendors. Verbal or written claims must be taken seriously and reported to the school district's legal counsel for investigation. If the school district does not have legal counsel, evidence of fraud or allegations should be reported to the State agency and the USDA.

The Method of Procurement

The procurement method is generally determined based on the total volume of equipment purchases in a fiscal year. School nutrition operators should check the current maximum dollar amounts allowed according to Federal, State, and local procurement thresholds. Current Federal limits for each procurement method are provided at <https://www.fns.usda.gov/cn/federal-micro-purchase-and-simplified-acquisition-thresholds>

- Informal purchases
 - Micro-purchases is used for purchases below the established current maximum allowable dollar amount for micro-purchases.
 - Simplified acquisition threshold, formerly known as small purchase threshold, exceeds the micro-purchase amount and is below the established current

maximum allowable dollar amount for the simplified acquisition threshold (see Table 18).

- Formal purchases
 - Invitations for Bid/Sealed Bids: used for purchases over a maximum dollar amount established for a simplified acquisition threshold purchase. An Invitation for Bid is used for contracts that are based on price alone.
 - Requests for Proposals/Competitive Proposals: used for purchases over a maximum dollar amount established for a simplified acquisition threshold purchase. A Request for Proposal/Competitive Proposal is used for contracts that take price into consideration as well as other requested factors, each of which is assigned a weight to determine the award.

Table 18

Requirements for Informal Procurement Processes

Type of Process	Micro-Purchase 2 CFR §200.320(a)	Simplified Acquisition Threshold 3 Bids and a Buy⁴⁸ 2 CFR §200.320(b)
Requirements	<ul style="list-style-type: none"> • The purchase amount cannot exceed the maximum allowable dollar amount in a fiscal year. • More than one supplier can provide the equipment solicited. 	<ul style="list-style-type: none"> • The purchase amount cannot exceed the maximum allowable dollar amount in a fiscal year.
Reminders	<ul style="list-style-type: none"> • Purchases within the micro-purchase threshold can be awarded without soliciting competitive price quotations if the price is reasonable. • To the extent practicable, purchases must be distributed equitably among qualified suppliers with reasonable prices. • There may be a verbal or written solicitation and response. 	<ul style="list-style-type: none"> • This method may be used when the value of the awarded contract is less than the simplified acquisition threshold. • There may be a verbal or written solicitation and response. • The lowest bid wins the award.

⁴⁸ 3 Bids and a Buy is an informal term used to describe the Simplified Acquisition Threshold

Type of Process	Micro-Purchase <u>2 CFR §200.320(a)</u>	Simplified Acquisition Threshold 3 Bids and a Buy⁴⁸ <u>2 CFR §200.320(b)</u>
Example	<ul style="list-style-type: none"> • A program needs to purchase food transport carts. Options include: <ul style="list-style-type: none"> ▪ The carts can be purchased from multiple suppliers at the same time, provided the entire purchase amount does not exceed the maximum allowable dollar amount or ▪ The carts can be purchased from a single supplier, provided the purchase amount does not exceed the maximum allowable dollar amount. 	<ul style="list-style-type: none"> • A program needs to purchase ovens at an amount less than the maximum allowable dollar amount: <ul style="list-style-type: none"> ▪ The supplier(s) met all solicitation requirements and provided the lowest bid. ▪ The ovens can be purchased from a single supplier (a bottom-line or all-or-nothing award) or multiple suppliers (a line-item bid), providing the entire purchase amount does not exceed the maximum allowable dollar amount.
Documentation Required	<ul style="list-style-type: none"> • Purchase orders issued • Receipts/invoices 	<ul style="list-style-type: none"> • Solicitation documents (specifications, evaluation criteria) • Bid quotes/responses • Evaluation of responses for award • Purchase orders • Receipts/invoices

⁴⁸ 3 Bids and a Buy is an informal term used to describe the Simplified Acquisition Threshold

Note. School nutrition professionals must check Federal, State, and local regulations for current procurement thresholds.

The purchase of items exceeding the maximum dollar amount for the simplified acquisition threshold in a fiscal year must use one of two formal procurement methods (see Table 19). The school nutrition professional should review the formal procurement methods with the local purchasing agency and State agency before deciding which method to use.

Table 19

Requirements for Formal Procurement Processes

Type of Process	Micro-Purchases 2 CFR §200.320(a)	Requests for Proposals/ Competitive Proposals 2 CFR §200.320(b)
Requirements	The purchase amount exceeds the maximum allowable dollar amount in a fiscal year	The purchase amount exceeds the maximum allowable dollar amount in a fiscal year
Reminders	<ul style="list-style-type: none"> • This method must be used when the value of the awarded contract is more than the simplified acquisition threshold. • It can be a line item or an all-or-nothing bid. • A written solicitation is used with a written, sealed bid response. • The lowest bid(s) meeting terms and conditions win(s) the award. 	<ul style="list-style-type: none"> • This method must be used when the value of the awarded contract is more than the simplified acquisition threshold. • It allows the evaluation of other variables in addition to the cost. • The cost must comprise at least 50% of the evaluation criteria. • A written solicitation is used with a written, sealed proposal response. • The highest-scoring proposal wins the award.
Example	<ul style="list-style-type: none"> • A program needs to purchase replacement equipment for six sites that meet the IFB allowable dollar amount. • The supplier(s) met all solicitation requirements and provided the lowest, sealed bid. • The equipment can be purchased from a single supplier (a bottom-line or all-or-nothing award) or multiple suppliers (line-item bid). 	<ul style="list-style-type: none"> • A program needs to purchase replacement equipment for six sites that meet the RFP allowable dollar amount. • The supplier met all the terms and conditions of the proposal. • The equipment is purchased from a single supplier.

Type of Process	Micro-Purchases <u>2 CFR §200.320(a)</u>	Requests for Proposals/ Competitive Proposals <u>2 CFR §200.320(b)</u>
Documentation Required	<ul style="list-style-type: none"> • Solicitation documents (specifications, evaluations, contracts, etc.) • Evaluation criteria and scoresheet • Bidder/offeror responses • Evaluation of responses for contract award • Executed contracts • Contract renewal/addendum/amendments, if applicable • Cost/price analysis documentation • Noncompetitive proposal authorization, if applicable • Invoices 	<ul style="list-style-type: none"> • Solicitation documents (specifications, evaluations, contracts, etc.) • Bidder/offeror responses • Evaluation of responses for contract award • Executed contracts • Contract renewal/addendum/amendments, if applicable • Cost/price analysis documentation • Noncompetitive proposal authorization, if applicable • Invoices

Note. School nutrition professionals must check Federal, State, and local regulations for current procurement thresholds.

Two methods for establishing contract awards include line-item awards used for informal simplified acquisition threshold and formal sealed bid procurements when the bid is awarded based on price only. Purchases are awarded to the vendor providing the lowest price for individual items. Multiple vendors may be awarded purchases from a line-item bid. This method allows vendors to bid on only those items they choose.

Bottom-line or all-or-nothing awards are used for informal simplified acquisition thresholds, formal sealed bids, or for formal competitive proposals. The purchase is awarded to the vendor with the lowest price for the total purchase, including all items. This method requires a price quote on all items and is attractive to vendors because it guarantees a sizeable award. Equipment may also be grouped for bottom-line awards.

In the case of a formal Request for Proposal (RFP), school nutrition programs consider various factors to establish the award, but the price must be the predominant factor. Other factors, such as vendor experience and references and the availability of technical support, may be included in determining the award of the RFP.

School nutrition professionals must exercise caution to ensure that the monetary value for each purchasing level is not exceeded. The practice or appearance of making multiple purchases throughout the fiscal year, which exceeds the previously approved purchase limit and procurement method, sometimes referred to as “chaining a bid,” must be avoided.

For example, suppose a school nutrition professional purchases equipment at the beginning of the school year, and the purchase price falls under the simplified acquisition threshold. They cannot make another equipment purchase exceeding the simplified acquisition threshold in the same fiscal year. If another purchase is needed, which would exceed the simplified acquisition threshold, they would be required to use a different procurement method, such as a formal procurement. Table 18 outlines informal procurement methods and documentation required to support the selection of method and purchase process. Local districts and states can determine more restrictive purchase amounts. The school nutrition professional can contact their State agency for guidance on these purchases. Table 20 is a simplified RFP evaluation tool sample that can be modified as needed.

Table 20

Sample RFP Evaluation Tool

Evaluation Criteria	Maximum Points	Points Awarded Out of 100
Vendor experience and references	15	
Ability to meet project scope and timeline	10	
Time required for replacement parts not covered by factory-authorized service	10	
Availability of technical support	15	
Cost ^a	50	
Total Points	100	

^a Cost must have the highest weight of all factors.

Noncompetitive procurement is the process of reaching an agreement when only one qualified bidder submits a bid, thereby eliminating competition. The school nutrition program and the bidder negotiate and compromise until they reach a reasonable and mutual agreement following the requirements in Table 21.

Table 21

Requirements for Noncompetitive Procurement

Type of Process	Noncompetitive Procurement 2 CFR 200.320(c)
Requirements	<p>Must meet specific circumstances, and one or more of the following must apply:</p> <ul style="list-style-type: none">• Does not exceed the micro-purchase threshold• Only available from a single source• An emergency exists in which competitive procurement would take too long• The Federal grantor (USDA) authorizes noncompetitive procurement• Competition is deemed inadequate, such as a single bidder to an IFB
Reminders	<p>This method requires approval from the local purchasing agency and State agency.</p>
Example	<p>A supply chain issue due to the COVID-19 pandemic has caused an interruption to the normal competitive bidding process:</p> <ul style="list-style-type: none">• The program issued a bid, in good faith, to multiple qualified bidders.• Evidence exists of attempts to secure pricing, but only one qualified bidder replies to the bid invitation.• A “no bid” is considered a bid response. The bidder should send a written response indicating why they are not bidding.
Documentation Required	<ul style="list-style-type: none">• Solicitation documents (specifications, evaluations, contracts, etc.)• Bidder/offeror responses (or indication of nonresponse)• Purchase orders issued• Receipts/invoices

Specifications

Detailed specifications are key to procuring the exact piece of equipment needed. The four C's of specification writing include:

- Clear: Words must be carefully considered to convey a precise meaning.
- Correct: Accurate, current, and precise information must be provided.
- Complete: All necessary information must be included.
- Concise: Unnecessary words or phrases must be excluded.

Clear, correct, complete, and concise specifications ensure that a school nutrition professional receives a 40-gallon, 208/60, single-phase tilt skillet with an electric mechanism instead of leaving the type and function of the tilt skillet required up to the interpretation of a bidder. Appendix E provides a checklist for the school nutrition professional to ensure all specifications are included and at the necessary level of detail.

Chapters Six and Seven contain detailed large and small equipment fact sheets, which provide the details needed to write specifications. Generically written specifications may result in lower equipment prices, and a lack of detail may not result in the expected equipment quality and performance. School nutrition professionals must provide the level of information and specificity needed to procure the item they expect and need to receive. It is legal to reference a manufacturer's name and model number to provide the quality of the item(s) expected, as long as "or approved equal" or "brand name or equivalent" is written into the specification. Caution should be exercised to avoid specifying equipment with features available only under one brand name. Again, the emphasis is on free and open competition, which legally allows all qualified vendors to compete. If previously used or older specifications are referenced, the school nutrition professional should review them for accuracy and currency.

General Specifications

The specifications used for bidding purposes include:

- Commonly used name
- Quantity requested
- Type
- Size
- Style
- Model
- Other characteristics include quality/gauge of stainless steel, certification requirements (e.g., NSF, UL)
- Drawings or diagrams for custom equipment
- Manufacturer's name and model, "or approved equal," or "brand name or equivalent," or "prior approved alternate that meets or exceeds the specifications in capacity, utilities, and benefits"

Electrical Requirements

Specifications should list the voltage, cycle, and phase (single-phase or three-phase) required for each piece of equipment. The purchased equipment should match the available electrical service if the equipment is being replaced and should be verified by an electrician. For example, if the equipment is being added to an existing kitchen, the following should be considered:

- Does the plug configuration fit the existing outlet? If not, consider a special order with the appropriate plug configuration.
- Is the current electrical service adequate for the additional equipment, or will the electrical panel need to be upgraded?
- Is the current electrical service adequate for hardwired equipment?

Gas Requirements

The type of gas available impacts the specifications of equipment to be purchased. Natural gas and propane (LP) are the two types of gas used in school nutrition program kitchens. Important considerations when buying and planning for gas equipment include:

- The appropriate gas hose must be used in a commercial foodservice application. A school nutrition program kitchen needs a commercial-duty, reinforced, flexible gas hose.
- A shut-off valve and a quick disconnect to unhook the equipment and restraining cables are suggested to prevent equipment from moving too far and placing stress on the gas hose.

Plumbing Requirements

Specifications should include hot and cold water requirements for the equipment. The size of the water line determines the water pressure to the equipment. Depending on the water quality, special filters may need to be added to the equipment to extend the usable life of the unit. School nutrition professionals can request a water quality report from the local water utility service or take a water sample at the point of use and provide it to prospective filter system vendors to aid in purchasing the best product to protect equipment from corrosive water damage. Drain placement and drain capacity should be considered to optimize the functionality and long-term usability of the equipment when in operation.

Mechanical Requirements

Ductwork connections used for venting dishwasher condensate hoods and cooking equipment exhaust hoods appear on the manufacturer's specification with the suggested air to be supplied or exhausted to the equipment. The school nutrition professional should seek the assistance of school nutrition program representatives with knowledge of mechanical systems before attempting to write specifications with mechanical requirements, such as those for ductwork and fans. Important considerations include:

- Special instructions to the bidder, such as "Deliver, uncrate, and set in place ready for the final connection by the contractor"
- Whether the space in the kitchen is air conditioned or non-air conditioned

Freight and Delivery Specifications

Specific freight and delivery instructions must be included in the specifications, including who pays for the delivery and installation. Delivery requirements may include necessary start-up needs, such as:

- Adjustments
- Initial oiling, as needed
- Demonstration of the equipment
- Specific delivery window
- Contingency for late arrival

Terms used in contracts to describe freight charges are as follows:

- Free (or freight) on Board (FOB): The ownership changes at the factory to the school nutrition program/purchaser.
- FOB destination: The ownership does not change until the equipment is delivered to the school nutrition program/purchaser.
- Freight prepaid: The seller pays the freight charges.
- Freight collected and allowed: The buyer (purchaser) pays the freight charges but deducts charges from the seller's invoice for goods.

Typically, the purchasing department addresses freight and delivery issues. However, the school nutrition professional should be familiar with relevant terminology. Drop shipments are considered a *higher-risk, lower-cost* option as the purchaser assumes all the risk of receiving, unloading the equipment, checking for damage, moving from the receiving location, unpacking, assembly, and setting in place for final connection. Delivered and set in place is considered a *lower-risk, higher-cost* option as the potential for complications is reduced for the purchaser, including the possibility of filing a claim.

To enhance the security of the equipment, the equipment can be shipped to the vendor, placing responsibility on the vendor to receive the equipment, inspect it, and deliver it to the school nutrition program site. If delivery is made to the school nutrition program site, the facility must be suitable to receive the equipment from the truck, and adequate personnel must be available to unload the equipment. For example, if there is no loading dock, the delivery should be made with a truck fitted with a lift gate. The building contractor may receive the equipment for new construction or an extensive renovation project.

Installation Requirements

The responsibility for installation must be written into the bid to avoid misunderstanding and wasted time in placing the equipment into operation. Installation requirements for new construction and large renovation projects are fairly standard and are typically coordinated by the building contractor. Important considerations for new and replacement equipment include:

- Who is responsible for the installation
- Who pays for the installation
- Who receives, uncrates, and sets the equipment in place
- Who removes packing debris
- Who makes utility connections
- Who removes existing equipment and relocates it to another location
- Who applies for permits, if needed
- Who installs, replaces, or adjusts fire suppression systems

Best Practices

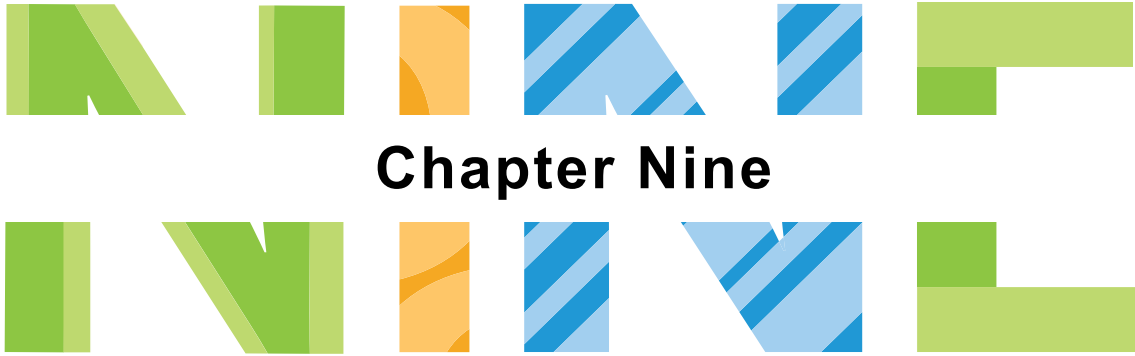
Preparing for the procurement process requires a tremendous amount of preparation and knowledge. However, the following best practices will help school nutrition professionals avoid mistakes and increase the likelihood that the entire process goes smoothly, from start to finish:

- A common approach is to use old specifications or guidelines from previous projects as a reference. However, these documents should not be used “as-is.”
- The equipment may be obsolete or discontinued. When a school nutrition professional uses current specifications, the right equipment for the intended purpose is procured.
- The school nutrition professional should be responsible and familiar with specification writing, as they are ultimately responsible for purchasing equipment using program funds.
- The school nutrition professional needs to be able to define their needs and determine the equipment that best fits the needs of their program.

- The effective coordination of utility and service requirements is crucial to the purchase and installation of equipment.
- Electrical, gas, plumbing, and mechanical requirements must be considered before the equipment is specified.
- When equipment is provided directly by a vendor with no contractor involved, the structural supports or load capacity of the structure should be verified by a structural engineer.
- A complete description of the expected equipment should be provided, and the school nutrition operator should specify the highest quality the budget allows. Inferior substitutions can be avoided when the description is complete, making it difficult for inferior equipment to meet the written specification.

For example, using the fact sheet for a tilt skillet in Chapter Six, a description of this piece may include items such as:

- Stainless steel
- Electric voltage and phase
- Knob and water-resistance electric controls
- Cooking temperature not to exceed 450 °F
- 40-gallon tilt skillet
- Electric tilt with manual override
- Adjustable legs
- Built-in pour lip
- Vented lid



Chapter Nine

The Procurement Process

CHAPTER NINE OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- The importance and content of procurement documents
- Solicitation of bids, including contents of a bid package
- The process of receiving, opening, and evaluating bids

Procurement decision-making and awards will be guided by the requirements of the appropriate procurement method. The formal procurement document or bid document contains the statement of the terms and conditions needed for the purchase of equipment and is a legally binding contract; it is not needed for informal purchases. The school district's legal counsel should review and approve this document before the procurement process begins. Procurement documents include general instructions for such areas as:

- Correction of mistakes
- Pricing
- Terms
- Payment schedule
- Billing
- Delivery
- Guarantees
- Defaults and delays
- Bidder qualifications
- Required documentation
- Special instructions for that piece of equipment

An example is provided in Appendix H, in the Boilerplate Section.

Solicitation of Bids

Solicitation is the process used to acquire bids from responsible and responsive bidders. Federal regulations govern the bid process for programs as recipients of Federal funds, and penalties exist for non-compliance. Regulations are available on the [USDA FNS website](#). School nutrition professionals should check local, State, and Federal procurement policies and regulations. They are responsible for ensuring that all procurement rules and laws are followed. In addition, each program must follow its local and State procurement plans if they are more restrictive than the Federal requirements.

To solicit sealed bids, a public notice of the intended purchase should be widely posted in various ways, including district and department websites, public websites for government bids, and advertised in the newspaper. Additional State regulations regarding the advertising schedule, posting locations, and other factors may exist. For example, a state may have a more restrictive advertising schedule than the Federal regulations require. Public notice should include the following:

- Name of the school nutrition program
- Brief description of the equipment
- Date of bid opening
- Name of the contact person
- Where bid documents can be obtained

Potential bidders should be provided with a bid package. The bid package is a complete set of instructions that should include the following:

- Detailed product information, including specifications and quantity desired
- General terms and conditions for doing business with the school nutrition program
- Special terms and conditions
- Bonding requirements, bid sureties, the agency responsible, and other requirements under State and local regulation

***ICN to provide callout: Bonding requirements require a contractor to obtain a payment bond to secure their obligation to pay all monies due to subcontractors who work on a project. A bid surety is a guarantee of payment back to the school district if the contractor fails to perform obligations stated in the bond.

- Pre-bid conference information, including date, time, and location of the meeting
- The basis for the contract award
- Explanation of how bidders can demonstrate compliance with bid requirements
- Requirements for user manuals

- Service and warranty provisions
- Delivery and installation instructions
- Cost provisions
- Non-collusion, anti-conflict of interest statement
- Time and place for formal public opening and recording of bids
- Certification regarding suspension, debarment, and voluntary exclusion
- Physical address and email address for the return of the completed bid document

Receiving and Opening Bids

Competitive submission of the bids requires the bidder to provide a written and sealed bid or electronic bid. Written terms and pricing are required to ensure both parties understand each other's expectations. Some school nutrition programs may require prices to be submitted in a separate, sealed envelope with the bid documents. The bid documents are opened first and reviewed to ensure the bid is responsive to specifications. If the bid is rejected, the prices are not shown and are returned to the unawarded bidder.

Documentation of the procurement process is essential during the receipt of bids. Therefore, permanent documentation files should be kept for all procurement activities. A standard form is typically used to maintain consistency and ease of record keeping. The standard form for reviewing bids should contain the following information for each bid submitted:

- Name of the vendor quoting the price
- Name of the individual quoting the price, manufacturer, and model number of the equipment offered
- Unit price
- Payment terms
- Delivery date
- Duration of the quote

When formal bids are received, each must be time-stamped and dated upon receipt. The time and date for bids received through email will be on the email. Bids are then deposited in a secure location or electronic file until the designated opening time. Unsealed bids or bids received after the specified time and date of bid opening are not accepted.

For IFB (sealed bids), each bid is opened publicly and recorded in the presence of interested parties. The following information is read aloud for each bid:

- Name of bidder
- Price
- Equipment offered

- Payment terms
- Freight on Board shipping point; describe that the seller retains legal title to the equipment until it reaches its destination
- Delivery date

General Reminders about Request for Proposals

- There is generally no public opening of RFPs, as factors other than price are used in determining the awarded vendor. However, all bid documents are public records.
- Once all established RFP evaluation criteria are reviewed and scored, the final determination of the award is made based on the highest score.

Bid Evaluation

The school nutrition professional will thoroughly review the bids in the next step of the procurement process. An objective review process ensures that bids are evaluated equitably and that the most advantageous bid is selected.

After opening all bids, each bid is evaluated using the established criteria. In the case of an IFB, Federal regulations require the award be made to the responsible bidder with the lowest price whose bid conforms to the bid document. In the case of an RFP, the award is made to the responsible bidder with the highest evaluation score. It is the school nutrition professional's obligation and authority to ensure that bidders follow the process correctly. Part of this obligation requires that bids be rejected that:

- Do not meet IFB/RFP requirements
- Are submitted unsealed in sealed bid situations
- Are for items of equipment that do not meet bid specifications
- Change the terms and conditions of the bid specifications
- Change the terms and conditions of the bid
- Are from bidders that are not responsible bidders

Bids may then be evaluated for price and other bidder responsiveness and responsibility characteristics. This part of the evaluation is completed in two phases:

Phase 1: Determination of The Lowest Bidder's Price

The first phase is to establish the true lowest bidder price. The following steps should be followed:

1. Check for clerical errors
2. Compare prices
3. Calculate prompt-payment discount offers, if applicable
4. Calculate the lowest net cost

Bids should also be checked to ensure they do not include tax because most school nutrition programs are tax-exempt.

Phase 2: Determination of the Lowest Bidder's Responsiveness and Responsibility

The next step is determining if the bidder responded to all of the material terms and conditions of the bid, known as bidder responsiveness. The school nutrition professional should consider the following:

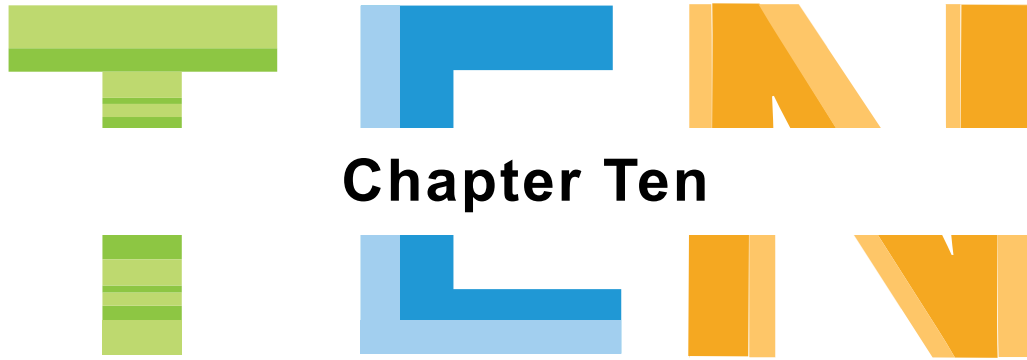
- The bidder's compliance with public policy
- The bidder's record of past performance
- The financial and technical resources of the bidder

Bidder responsibility is a serious consideration in the acceptance of bids. The bid should describe the minimum standards expected of a responsible bidder in measurable terms, which must not provide for negotiation or evaluation. Any deviation from the bid indicates a non-responsive bidder, and the bid may not be considered for the award. Examples of non-responsive bidders include situations where:

- The bidder fails to receive pre-approval for alternate equipment
- The bidder's delivery schedule does not address the delivery window and location requirements
- The bidder fails to furnish bid bonding requirements and bid sureties
- The bidder fails to complete the required certification or the attachment to the bid

Award of the Contract

The award shall be made by mailing or furnishing a properly executed award document to the successful bidder.



Chapter Ten

Completing the Equipment Purchasing Process, Installation, and Staff Training

CHAPTER TEN OBJECTIVES

After reading this chapter, the school nutrition professional will understand:

- How to place an equipment order
- Factors involved in receiving, installing, and starting up the equipment
- Equipment demonstration and staff training

Placing Orders

After a formal bid is evaluated and awarded or purchasing decisions are made, as in the case of micro-purchases, purchase orders may be placed. A purchasing department typically administers purchase orders, contracts, and other purchasing functions in school nutrition programs that are making a large number of purchases. For smaller school nutrition programs, the school nutrition professional may be responsible for these functions. Therefore, general knowledge of the legal aspects of purchasing is essential. The school district's legal counsel is a valuable resource on legal matters related to procurement procedures. If the school district does not have legal counsel, the State agency may be contacted for guidance.

Receiving

Site Preparation

Preparation of the site for the installation of equipment is a critical step. This process should be completed, and all regulatory inspections passed before receiving the equipment. Site preparation varies according to the type of equipment. For example, walk-in refrigerators and freezers must be constructed, and cooking equipment may require hoods to be installed while other equipment is set in place. In addition, each piece of equipment has unique clearances and utility connection requirements. Food preparation for the site may need to be altered during the delivery and installation of new equipment if it occurs during school hours. For example, all

product should be removed from older equipment, and lunches may need to be prepared and packaged at another school and delivered. The school should plan ahead for any disturbances.

Receiving the Equipment When It Arrives

Receiving equipment signifies the end of the entire procurement process and is the last major step before the new equipment is ready to use. The receiving process provides a quality assurance step in which the accuracy and completeness of the specifications are determined. In programs where the school nutrition professional does both purchasing and receiving, the receiving process may be more straightforward than in larger districts where duties may be divided. Communication is critical to ensure a smooth process when purchasing and receiving functions are separated in a district.

There should also be a method for communicating delivery problems when the wrong piece of equipment is received or there is damage. Plans should be made in advance in case of unexpected delays or damage. Essentials for receiving new equipment include:

- Thorough review of the specification and purchase order against the invoice and equipment
- Training for all employees who will use the equipment, as well as maintenance staff who may receive, install, and repair the equipment
- Tools for checking the equipment (e.g., desk, rolling cart, clipboard, computer system)
- Tools for uncrating the equipment
- Clear communication between the school nutrition professional and vendor about specification and delivery issues, such as a tilt skillet specified with adjustable legs but delivered with non-adjustable legs
- Appropriate follow-up to communicate issues to the vendor that have been resolved or unresolved and a plan for resolution
- Preparation of the site for installation

During receiving, procedures must be followed regardless of who is assigned to receive the equipment from the manufacturer. The foodservice equipment vendor, school nutrition program warehouse personnel (if the school nutrition program has a warehouse), and other staff must understand and follow the procedures to avoid problems documenting damage, shortage, or warranty claims. Each school nutrition program should have a system for communicating the brand and code numbers of products approved during bid or price quote awards to the school nutrition professional and the maintenance and facilities department, who may have responsibility for equipment repair and preventive maintenance. After installation, the school nutrition professional or maintenance staff may tag the equipment with Property Equipment Numbers to its specific location and catalog equipment such as model and serial number in the program's database. In general, receiving staff require training in the following areas:

- Inspecting the crates and packaging for shipping damage, which may include:
 - Water, oil, or other stains on the packaging

- Crushed or dented packaging that may result in damage to the equipment
- Packaging that has been taped shut or resealed to cover up damage
- Inspecting the equipment for dents, scratches, and broken or missing pieces
 - Even if the crate appears in excellent condition, the equipment may still be damaged.
- Reading the package label to determine how accurately the specification and purchase order were met. Purchase order information may include the establishment number and where the product was manufactured.
- Communicating a product problem to a purchasing department or school nutrition program administration office.
- Tracking product code numbers to assign a number to a specific piece of equipment, with the manufacturer controlling product code assignments.
- Monitoring dates of installation and warranty expiration
 - Necessary when a problem is being communicated to the manufacturer, particularly regarding warranties
- Following district reporting procedures

On occasion, damage occurs during shipping and handling. Inspections should be conducted immediately because there are time limitations for filing freight claims. If equipment arrives damaged, or damage occurs before the equipment has been inspected, the school nutrition professional must report the damage to the vendor. If there are discrepancies, such as a shortage of pieces of equipment, the information should be noted on the freight bill before the carrier leaves.

Security of new equipment is a concern for all equipment that is more easily moved or on casters, but there is a potential for theft of all equipment received until it is secured and behind locked doors. Therefore, some school nutrition programs prefer to have small equipment items delivered last in new construction projects.

Common Issues with Equipment Purchases

Consideration should be given in advance to the impact potential problems may have on the school nutrition program. Even with the best plans in place, things can go wrong. The school nutrition professional should make sure there is a plan for unexpected delays. Some of the questions that should be considered are:

- Who will contact the vendor for further information about delayed equipment deliveries?
- If construction delays occur, will equipment need to be stored in a secured area before being installed?
- How will delays affect equipment warranties?
- Who pays for costs incurred as a result of either construction or equipment delays?
- If there is a delivery delay, how will the school nutrition program function?

Uncrating the Equipment

Part of receiving equipment is uncrating it once the crate has been inspected. Crates are generally made from heavily reinforced cardboard or wood, making the uncrating challenging. In addition, crates should be kept in useable condition and not thrown out immediately. Crates might be needed to return any equipment sent in error or damaged. School nutrition staff should keep crates in usable condition until the school nutrition professional authorizes disposal.

Once the equipment is carefully uncrated, the manufacturer's data plate is checked to be sure this is the equipment on the bid document. The data plate may be located anywhere on the equipment (e.g., back, front, side, inside a door panel). The data plate has the following information:

- Manufacturer's name
- Model number
- Electrical specifications (e.g., voltage, cycle, phase)
- Gas specifications (e.g., BTU, gas type)
- Steam specifications

If the data plate does not precisely match the specifications, the equipment may need to be returned to the manufacturer. The equipment vendor or manufacturer's representative should be contacted immediately.

Installation

Once the site has been prepared as specified and the equipment has been received, uncrated, verified for identifying information, and checked for damage, installation can be scheduled. The bid document has already identified who is responsible for making the final utility connections and when this will be done. Proper installation is essential for equipment to operate effectively and efficiently. The manufacturer provides detailed installation procedures and requirements for site preparation and will not cover warranty claims resulting from improper installation. Installers generally visit the site before the installation to determine the distance between the equipment and the utility connections and the wiring, piping, and conduit materials required for a successful job.

Certain types of equipment have specific instructions regarding clearances. The clearances are determined for operating and maintenance purposes and should be followed. For example, most steam equipment requires air gap drain connections. Manufacturers recommend specific placement and length of drain pipes to drains.

The school nutrition professional should also retain shop drawings, also known as fabrication drawings, on special order items. The drawings provide detailed, precise plans that translate the intent of the design.

Equipment Start-Up

Once the installation has been completed according to the manufacturer's instructions and the proper power has been connected, the start-up can be arranged. Start-up may be the installer's responsibility. Many manufacturers also provide start-up services through the authorized service agency. The person or party responsible for the start-up should also have been identified in the specification. The start-up includes the following:

- On-site inspection to verify that the equipment was installed according to the manufacturer's instructions
- On-site inspection to confirm that the equipment is operating properly
- Recalibration, if needed as a result of shipping and handling (not a warranty item)

User Manuals and Warranty Registration Cards

Three types of manuals should be included with a new piece of equipment: a service manual, an installation and operation manual, and a parts manual. A minimum of three copies of each manual should be requested in the bid document for the following parties: the school nutrition professional, the maintenance and facilities department, and the file for future projects. Many manufacturers make these manuals available online. School nutrition professionals should ensure that a paper copy is retained for easy access.

After the start-up has been completed, all warranty registration cards, which provide physical proof of warranty to replace or repair equipment, should be returned to the manufacturer. In addition, final inspections should be requested from the vendor and the school district's facilities department, as needed. Final permits from local regulatory agencies should be acquired at this time.

School Nutrition Staff Training

The installation job is not complete until the staff members operate the new piece of equipment in food production. To assist with this process, some manufacturers provide videos or online instruction. Each staff member needs to demonstrate competence in the proper use and care of the equipment to the school nutrition professional. Competency assessment is essential to verify that the staff can operate the equipment properly. One example of a competency assessment checklist is in Appendix D, where the Training Assessment Checklist may be found. All personnel must sign the form to verify their attendance at the demonstration and document it for liability purposes. The demonstration should include the following:

- Instructions on how to operate the equipment safely
- Instructions on daily care and preventative maintenance
- Introduction to online videos and manuals

- Helpful tips on use and care that are not in the manual
- Hands-on practice for each participant

The person conducting the use and care demonstration should be a qualified trainer representing the manufacturer. The demonstration should not be scheduled until the equipment has been certified for proper connection and start-up is complete. All necessary district maintenance staff must attend the demonstration. The demonstration may also be recorded for use in follow-up training and for training new employees.

This concludes the narrative portion of the Facility Design and Equipment Purchasing for School Nutrition Programs. Please review the important information contained in the appendices, including useful templates and checklists.

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Appendix A

School Nutrition Program Profile

I. Contact information

Project Name
School District
Address
Project Budget

The Planning Team	Name	Phone	Cell Phone	Email
School Nutrition Director				
Superintendent				
Assistant Superintendent				
Principal				
Purchasing Director				

I. Contact information

The Planning Team	Name	Phone	Cell Phone	Email
Construction Services Director or Project Manager				
Maintenance or Facility Director				
School Board Chair or Member				
Building Contractor				
Architect				
Electrical Engineer				
Mechanical Engineer				
Structural Engineer				
Interior Designer				
Foodservice Consultant				

II. Major Milestones

	Projected Start Date	Projected End Date	Team Members	Notes
Complete Planning (including data collection and completion of the Program Profile)				
Conduct Pre-Planning Meeting(s)				
Initiate Procurement Process				
Prepare Schematic Design				
Design Development				
Prepare Construction Documents				
Oversee Construction Administration Phase				

III. Site Information

	Current	Five to Ten Year Plans	Notes
Grade Levels			
Student Ages			
School Capacity			
Projected Enrollment			
Meal Service Offered (check all that apply)	<input type="checkbox"/> Breakfast <input type="checkbox"/> Lunch <input type="checkbox"/> Reimbursable Snack <input type="checkbox"/> Supper Program <input type="checkbox"/> Summer Feeding Program <input type="checkbox"/> Community Meal Service <input type="checkbox"/> Senior Citizens Program <input type="checkbox"/> Other _____	<input type="checkbox"/> Breakfast <input type="checkbox"/> Lunch <input type="checkbox"/> Reimbursable Snack <input type="checkbox"/> Supper Program <input type="checkbox"/> Summer Feeding Program <input type="checkbox"/> Community Meal Service <input type="checkbox"/> Senior Citizens Program <input type="checkbox"/> Other _____	

III. Site Information

Daily Projected Customer Meal Count	Breakfast	Lunch	Snack/Supper	Other
Students				
Teachers/Staff				
Others				

IV. Notes on Stakeholder Input, Previous Project Successes and Challenges, and Trends

Preferences	
Uniqueness of the Current Program	
Competitors and Their Offerings	
Previous Project Successes	<ul style="list-style-type: none"> • Receiving • Storing • Preparing • Cooking • Holding • Transporting • Serving • Cleaning and Sanitizing • Waste Removal
Previous Project Challenges	<ul style="list-style-type: none"> • Receiving • Storing • Preparing • Cooking • Holding • Transporting • Serving • Cleaning and Sanitizing • Waste Removal
Trends Affecting Future Operations	

V. Meal Service Information

Number of Breakfast Periods		Length of Breakfast Service Time	
Number of Lunch Periods		Length of Lunch Service Time	
Number of Snack/Supper Programs		Length of Snack/Supper Program	
Service Type	<input type="checkbox"/> Block class scheduling <input type="checkbox"/> Breakfast in the classroom <input type="checkbox"/> Breakfast after the bell <input type="checkbox"/> Continuous meal service <input type="checkbox"/> Grab-and-go <input type="checkbox"/> Open campus <input type="checkbox"/> Other _____		

VI. Menu and Storage Requirements

Item	Weekly Average Case Count		
Meats/Meat Alternates	Dry	Refrigerated	Frozen
Item	Weekly Average Case Count		
Vegetables	Dry	Refrigerated	Frozen

VI. Menu and Storage Requirements

Item	Weekly Average Case Count		
Fruits/Juice	Dry	Refrigerated	Frozen

Item	Weekly Average Case Count	
Grains	Dry	Frozen

VI. Menu and Storage Requirements

Item	Weekly Average Case Count	
Fluid milk	Dry	Refrigerated

Item	Weekly Average Case Count	
Condiments/Beverages/Other	Dry	Frozen

VI. Menu and Storage Requirements

Item	Weekly Average Case Count
Paper supplies	Dry

Item	Weekly Average Case Count
Chemical supplies	Dry

VII. Type of Food Production System

Type of Facility

- On-site production and serving
- On-site production for meal service and satellite locations
- Satellite: Finish production and serving
- Central: Production only
 - Full menu items
 - Specialized menu items (list)
 - Bakery items

VIII. Type of Production

Production Method	<ul style="list-style-type: none"><input type="checkbox"/> Cook and serve (including scratch cooking, speed scratch cooking, and heat and serve)<input type="checkbox"/> Chilled food system<ul style="list-style-type: none"><input type="checkbox"/> Blast chill<input type="checkbox"/> Blast freeze<input type="checkbox"/> Water bath chill<input type="checkbox"/> Combination system<input type="checkbox"/> Rethermalization system (a system that takes pre-cooked or prepared foods through a process of heating and finishing safely and effectively)<ul style="list-style-type: none"><input type="checkbox"/> Conventional equipment<input type="checkbox"/> Specialized equipment<input type="checkbox"/> Other _____
Satellite Receiving and Serving	<ul style="list-style-type: none"><input type="checkbox"/> Bulk hot<input type="checkbox"/> Bulk chilled for heating and serving<input type="checkbox"/> Pre-plated<ul style="list-style-type: none"><input type="checkbox"/> Hot<input type="checkbox"/> Chilled for reheating and serving

IX. Type of Meal Service Systems

<p>Serving Methods (include those used for catering)</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Food court <input type="checkbox"/> Kiosks or multiple decentralized areas <input type="checkbox"/> Mobile units/Carts <input type="checkbox"/> Salad bar <input type="checkbox"/> Scatter or scramble <input type="checkbox"/> Self-service line <input type="checkbox"/> Traditional serving line <input type="checkbox"/> Window-style service <input type="checkbox"/> Vending machines <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
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X. Dining Area

Area	Seating capacity
Interior	
Exterior	
Faculty/Staff	
Common	

XI. Service Considerations

Point-of-sale (POS) Terminals	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Payment Methods	<input type="checkbox"/> Biotechnology <input type="checkbox"/> Cash <input type="checkbox"/> Computer cards <input type="checkbox"/> PIN (personal identification number)	<input type="checkbox"/> Roster <input type="checkbox"/> Tally sheet <input type="checkbox"/> Tickets <input type="checkbox"/> Other _____
Merchandising	<input type="checkbox"/> Electronic menu <input type="checkbox"/> Manual menu boards	<input type="checkbox"/> Signage <input type="checkbox"/> Other _____
Condiment Location	<input type="checkbox"/> Serving counters <input type="checkbox"/> Condiment counters <input type="checkbox"/> Serving area	<input type="checkbox"/> Dining area <input type="checkbox"/> Other _____
Condiment Dispensing Method	<input type="checkbox"/> Auto pump <input type="checkbox"/> Manual pump	<input type="checkbox"/> Portion packs <input type="checkbox"/> Other _____
Beverage Dispensing Method	<input type="checkbox"/> Self-serve with cartons from a milk cooler <input type="checkbox"/> Beverage refrigerator with a door <input type="checkbox"/> Milk, bulk dispenser	<input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
Water	<input type="checkbox"/> Water dispensers <input type="checkbox"/> Water fountains	<input type="checkbox"/> Other _____
Tableware	<input type="checkbox"/> Compartment tray: size _____ <input type="checkbox"/> Open tray: size _____ <input type="checkbox"/> Dishes <ul style="list-style-type: none"> <input type="checkbox"/> Permanent ware <input type="checkbox"/> Disposable 	<input type="checkbox"/> Flatware <ul style="list-style-type: none"> <input type="checkbox"/> Permanent ware <input type="checkbox"/> Disposable
Will students self-serve reusable trays/dishes/flatware?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

XII. Cleaning and Sanitizing

Dishmachine Sanitizer	<input type="checkbox"/> Chemical	<input type="checkbox"/> Hot water
Three Compartment Sink	<input type="checkbox"/> Chemical	<input type="checkbox"/> Hot water
Pot and Pan Sink with Disposal (requires four sinks)	<input type="checkbox"/> Chemical	<input type="checkbox"/> Hot water
Kitchen Cleaning Equipment	<input type="checkbox"/> Hand <input type="checkbox"/> Steam	<input type="checkbox"/> Pressure
Kitchen Cleaning Equipment: Location	<input type="checkbox"/> Foodservice area	<input type="checkbox"/> Other _____
Floor Cleaning Mechanical Equipment	<input type="checkbox"/> Steamer <input type="checkbox"/> Scrubber	<input type="checkbox"/> Other _____
Mop Room with Sink	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Garbage Can Wash Area	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Washer and Dryer Area	<input type="checkbox"/> Yes	<input type="checkbox"/> No

XIII. Waste Disposal

Waste Disposal Systems and Counts	<input type="checkbox"/> Cans _____ <input type="checkbox"/> Compactor _____ <input type="checkbox"/> Dumpster _____	<input type="checkbox"/> Garbage disposal _____ <input type="checkbox"/> Pulper _____
Size of Garbage Receptacles		
Frequency of Garbage/Recycling Pick-up	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Twice a month	
Recycling Options	<input type="checkbox"/> Cans <input type="checkbox"/> Cardboard <input type="checkbox"/> Food <input type="checkbox"/> Glass	<input type="checkbox"/> Paper <input type="checkbox"/> Plastic <input type="checkbox"/> Styrofoam
Composting	<input type="checkbox"/> Yes	<input type="checkbox"/> No

XIV. Employee Facilities

Restroom Facilities	<input type="checkbox"/> Handwashing facilities <input type="checkbox"/> Lavatories	<input type="checkbox"/> Gender-specific facility <input type="checkbox"/> Unisex facility
Count of Employee Lockers		
Office	Number of offices: _____	Person(s) per office: _____
Office Furniture	<input type="checkbox"/> Built-in	<input type="checkbox"/> Free-standing
Office Equipment Requirements		
Staff Break Room	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Time Clock	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other		

XV. Technical Information

<p>Available Utilities</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Gas <ul style="list-style-type: none"> <input type="checkbox"/> Propane <input type="checkbox"/> Natural <input type="checkbox"/> Electricity 	<ul style="list-style-type: none"> <input type="checkbox"/> Water <input type="checkbox"/> Sewer
<p>Electricity: Voltage/Phase</p>	<ul style="list-style-type: none"> <input type="checkbox"/> 110-120/1 <input type="checkbox"/> 208/1 <input type="checkbox"/> 208/3 <input type="checkbox"/> 220-240/1 <input type="checkbox"/> 220-240/3 <input type="checkbox"/> 440-480/3 	<ul style="list-style-type: none"> <input type="checkbox"/> Steam <input type="checkbox"/> psi _____ <input type="checkbox"/> Flow _____

XVI. Large Equipment Selection Matrix

Using the menu as the guide, select and check equipment used to prepare menu items. Many menu items may be prepared using several different cooking equipment items. Equipment selection should be based on desired cooking results, utility energy conservation, and employee efficiency. When completed, analyze the total number of checks for each type of equipment item. The results should justify and direct the equipment selection. This chart is not meant to be inclusive. Use the blank columns as necessary. Examples are provided.

Menu Items	Combination Oven-steamer	Convection Oven	Conveyor Oven	Ice Machine	Induction Cookware	Griddle	Ice Machine	Mixer	Pressure Steamer	Pressure-less Steamer	Range Top	Tilting Braising Pan	Other	Other

Notes regarding equipment audit, including advantages and disadvantages of what is currently available and considerations for keeping existing equipment versus purchasing new equipment.

XVII. Other Considerations

Will any existing equipment be used?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Who is responsible for moving the existing equipment?		
Will the outside groups use the facility?	<input type="checkbox"/> Yes <input type="checkbox"/> How?	<input type="checkbox"/> No
What areas should have limited access? (e.g., manager's office, storage)		
Other design considerations		

Appendix B

Additions and Renovations Checklist for the Planning Team

- Organize the planning team by determining who to include based on the project's scope and needs.
- Identify the guidance and approval agencies and the corresponding deadlines and approval timeframes.
- Research and evaluate school nutrition regulations and trends that affect facility design and equipment purchases.
- Gather data and complete the Program Profile.
- Plan the facility layout and placement of equipment following regulations, applicable recommendations (e.g., workflow, ergonomics), and input from the Program Profile.
- Review the plan for the ability to accommodate future expansion.
- Consider and decide on design by workspace, including the required and recommended surfaces, floors, walls, ceilings, lighting, and windows.
- Evaluate the energy impact of all cooking activities regarding energy conservation, energy source, and equipment.
- Plan for plumbing and ventilation based on needs and existing structures, following all applicable codes and regulations.
- Review and verify all original architectural drawings.
- Determine structural integrity of existing facility as needed.

Appendix C

New Construction Checklist for the Planning Team

- Organize the planning team by determining who to include based on the project's scope and needs.
- Identify the guidance and approval agencies and the corresponding deadlines and approval timeframes.
- Research and evaluate school nutrition trends that affect facility design and equipment purchases.
- Gather data and complete the Program Profile
- Plan the facility layout and placement of equipment following regulations, applicable recommendations (e.g., workflow, ergonomics), and input from the Program Profile.
- Review the plan for the ability to accommodate future expansion.
- Consider and decide on design by workspace, including the required and recommended surfaces, floors, walls, ceilings, lighting, and windows.
- Evaluate the energy impact of all cooking activities regarding energy conservation, energy source, and equipment.
- Determine equipment needs based on the Program Profile, budget, and characteristics such as total cost of ownership (TCO), capacity, efficiency, performance, materials, sustainability, safety standards, and warranties.

Appendix D

Training Assessment Checklist

Equipment: _____ Name: _____

Training Task	Completed
School nutrition staff demonstrate the correct use of equipment.	<input type="checkbox"/>
School nutrition staff demonstrate correct safety procedures in the use of equipment.	<input type="checkbox"/>
School nutrition staff demonstrate the proper techniques for cleaning and sanitizing equipment.	<input type="checkbox"/>
School nutrition staff demonstrate proper preventive maintenance recommended for optimal care of the equipment.	<input type="checkbox"/>

Comments:

Instructor: _____

Date: _____

Appendix E

Equipment Specification Checklist

The following checklist can be used to ensure all specifications for equipment are included in the IFB/RFP and provide the necessary detail. Evaluated each item under “What to include” as follows: 1 = not addressed; 2 = incomplete; 3 = completed; 4 = not applicable.

Overall specifications: What to include	Included in spec/design
Brand and model number “or approved equal”	
Size and capacity of the equipment	
Special features, finishes, and options specified (e.g., locking casters)	
Stainless steel gauge requirements	
Electrical requirements (e.g., voltage, cord sets, amperage)	
Gas requirements	
Plumbing requirements	
Shop drawings with gas flow rate, inlet gas pressure, drain sizes, and water pressure requirements.	
Certification marks (e.g., NSF, UL)	
Warranty requirements (one-year minimum)	
HVAC shop drawings with exhaust requirements in cubic feet per minute (cfm), make-up air requirements (to hood) in cfm, and heat given off by refrigeration equipment	
Availability of replacement parts Placing orders: What to include	
Quantities indicated	
The range of delivery dates indicated Receiving/Installation/Start-up: What to include	
On-site adjustments by the equipment supplier	
On-site demonstration and training	
Online videos	
Manuals	

Appendix F

The following information provides a sample outline and verbiage for school districts to use for writing the introduction to a Solicitation/Invitation for Bid. This sample document is not intended to be used verbatim, as State and local agencies will require specific language.

Solicitation/Invitation for Bid

In accordance with federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, this institution is prohibited from discriminating on the basis of race, color, national origin, sex (including gender identity and sexual orientation), disability, age, or reprisal or retaliation for prior civil rights activity.

Program information may be made available in languages other than English. Persons with disabilities who require alternative means of communication to obtain program information (e.g., Braille, large print, audiotope, American Sign Language), should contact the responsible state or local agency that administers the program or USDA's TARGET Center at (202)720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339.

To file a program discrimination complaint, a Complainant should complete a Form AD3027, USDA Program Discrimination Complaint Form which can be obtained online at: <https://www.usda.gov/sites/default/files/documents/USDA-OASCR%20P-ComplaintForm-0508-0002-508-11-28-17Fax2Mail.pdf>, from any USDA office, by calling (866)632-9992, or by writing a letter addressed to USDA. The letter must contain the complainant's name, address, telephone number, and a written description of the alleged discriminatory action in sufficient detail to inform the Assistant Secretary for Civil Rights (ASCR) about the nature and date of an alleged civil rights violation. The completed AD-3027 form or letter must be submitted to USDA by:

1. Mail: U.S. Department of Agriculture Office of the Assistant Secretary for Civil Rights 1400 Independence Avenue, SW Washington, D.C. 20250-9410; or
2. Fax: (833) 256-1665 or (202) 690-7442; or
3. Email: program.intake@usda.gov

Notice of Solicitation

The purpose of this Invitation for Bid is for the purchase of large foodservice equipment. The equipment is needed by (DATE). It is the purpose and intent of this invitation to secure bids on the items specified on the sheets attached. The written bid must be submitted in a sealed envelope to:

(SCHOOL DISTRICT)
(NAME OF PERSON TO RECEIVE BIDS)
(ADDRESS)
(TELEPHONE NUMBER)
(EMAIL)

(SCHOOL DISTRICT) reserves the right to reject any and all bids, in whole or in part and/or to accept the bids that in its judgment will be in the best interest of the program. No bid will be allowed to be withdrawn for any reason after (DATE).

Prices bid shall be firm (or escalating) for the period between (DATE) and (DATE) and shall include all charges for packing and transporting to the individual centers at the addresses on the attached sheet. Prices will not include Federal Excise Tax or State Sales Tax.

In the event that the successful bidder(s) are unable to perform as required, the successful bidder(s) shall be responsible for the securing of items or services from an alternate vendor and pay that vendor any additional costs involved in supplying the items.

Bid Opening Date and Time	
Bid Opening Location	
Award Date	
Installation or Start Date	
Name of Awardee (completed after Contract is awarded)	

The successful bidder or bidders must:

1. Submit bid in a sealed envelope.
2. Bids must be received by (DATE) (TIME). Late bids will not be accepted.

In the event that the successful bidder(s) are unable to furnish the brand which was indicated in their bid, delivery may not be made until (Title of Person(s)) has been contacted and an alternate approved.

All items shall be subject to inspection after arrival at the destination. If any items are found to be defective or otherwise not in conformity with the specification, such items will be rejected. It will be the responsibility of the vendor to defray any cost involved in the delivery and return of rejected articles.

The successful bidder(s) shall be paid in payments or in full, upon submission if an itemized invoice with the prices stipulated herein for the items delivered and accepted. Any discounts are to be noted on the bid sheets and reflected on the voices. Invoices should be sent to (NAME) at (ADDRESS).

If any potential bidder is in doubt as to the true meaning of this Invitation for Bid, he/she may submit a request for an interpretation to (NAME) (ADDRESS) (TELEPHONE NUMBER) (EMAIL ADDRESS). Any interpretation will be made by addendum and a copy mailed to each person receiving an Invitation for Bid. The School District will not be responsible for any other explanation or interpretation of such documents that anyone presumes to make on behalf of the School District.

Vendors shall not submit a bid for the contract if a conflict of interest, real or apparent, would be involved. Conflicts of interest arise when any of the following has a financial or other interest in the firm:

- a. An employee, officer, or agent of (SCHOOL DISTRICT)
- b. Any member of the immediate family of the above-named persons
- c. The partner of any of the above-named persons
- d. Any officer, employee, or agent of the vendor prepared specifications, work orders, bid or contract provisions for this acquisition

Attachment: Certification of Debarment/Suspension (Federal Form Number _____)

COMPANY NAME _____ DATE _____
SUBMITTED BY _____ TITLE _____
SIGNATURE _____
ADDRESS _____
TELEPHONE NUMBER _____
EMAIL ADDRESS _____

Appendix G

The following information provides a sample outline and verbiage for school districts to use when writing the introduction to a Request for Proposal. This sample document is not intended to be used verbatim, as State and local agencies will require language specific to their agencies.

Request for Proposals

In accordance with federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, this institution is prohibited from discriminating on the basis of race, color, national origin, sex (including gender identity and sexual orientation), disability, age, or reprisal or retaliation for prior civil rights activity.

Program information may be made available in languages other than English. Persons with disabilities who require alternative means of communication to obtain program information (e.g., Braille, large print, audiotope, American Sign Language), should contact the responsible state or local agency that administers the program or USDA's TARGET Center at (202)720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339.

To file a program discrimination complaint, a Complainant should complete a Form AD3027, USDA Program Discrimination Complaint Form which can be obtained online at: <https://www.usda.gov/sites/default/files/documents/USDA-OASCR%20P-ComplaintForm-0508-0002-508-11-28-17Fax2Mail.pdf>, from any USDA office, by calling (866) 632-9992, or by writing a letter addressed to USDA. The letter must contain the complainant's name, address, telephone number, and a written description of the alleged discriminatory action in sufficient detail to inform the Assistant Secretary for Civil Rights (ASCR) about the nature and date of an alleged civil rights violation. The completed AD-3027 form or letter must be submitted to USDA by:

1. mail: U.S. Department of Agriculture Office of the Assistant Secretary for Civil Rights 1400 Independence Avenue, SW Washington, D.C. 20250-9410; or
2. fax: (833) 256-1665 or (202) 690-7442; or
3. email: program.intake@usda.gov

The (SCHOOL DISTRICT) is accepting proposals for the purchase of large foodservice equipment.

All materials and equipment should be bid new and include installation, disconnecting existing equipment for placement of new equipment, freight (if required) and shipping in the bid price. All equipment and materials must be in current compliance with all state and local code requirements.

RFP Opening Date and Time	
RFP Opening Location	
Award Date	
Installation or Start Date	
Name of Awardee (completed after Contract is awarded)	

Scope of Work

Vendors will itemize pricing for base price of equipment, disconnecting existing equipment for placement of new equipment and installation. Prices quoted shall include charges for transporting any or all items to (EACH SCHOOL, CENTRAL WAREHOUSE, ETC.). Prices quoted will not include Federal Excise Tax or Sales Tax. Any discounts to be given must be specifically stated on the quotation sheet.

The School District reserves the right to reject any and all quotes in whole, or in part, and/or to accept the quotations that in its judgment will be in the best interest of the School Nutrition program.

Response to the quotations will be given orally with a written confirmation upon request. Any proposed alternates to the specifications listed must be approved by (TITLE OF PERSON(S)) five days prior to the quotation.

An example of the alternate may be required to establish quality.

All items will be inspected upon arrival. If any articles are found defective or otherwise not in conformity with the specifications, the School District shall have the right to reject such items. It will be the responsibility of the vendor to defray any cost involved in the delivery and return of rejected items.

Evaluation Factors:

The School District will award contracts on the basis of best value. Awards will be made to the best responsive, responsible offer, price and other factors considered. In determining the best value for the School District, the Board is not restricted to price alone. In determining the award, the Board shall consider 1) Purchase Price, 2) The extent to which the vendor meets the Board's needs, 3) Vendor's ability to provide services on equipment following installation, and 4) Vendor references and past history serving School Nutrition programs.

The Evaluation criteria will be based on:

1. Purchase price **1-50 points**
2. The extent to which the vendor meets the Board's needs **1-20 points**
3. Vendor's ability to provide service on equipment following installation **1-20 points**
4. Vendor references and history serving School Nutrition programs **1-10 points**

Total Possible Evaluation Criteria Points: 100 points

All quotations are firm for the period of (DATES).

COMPANY NAME _____ DATE _____
SUBMITTED BY _____ TITLE _____
SIGNATURE _____
ADDRESS _____
TELEPHONE NUMBER _____
EMAIL ADDRESS _____

Appendix H

Sample Contract Language for Invitation for Bid

CONTRACT SECTION I - INVITATION FOR BID

See Appendix F for IFB introductory pages.

II GENERAL INSTRUCTIONS

Sealed, written bids will be received by the _____ School District at the time and place specified on the Invitation for Bid. Neither dating of bid form nor placing in mail by this date will meet requirements. Bid must be received on or before date and time stated. The _____ School District reserves the right to reject any and all bids and to waive any and all formalities. While it is the intention of the _____ School District to purchase all items listed, the right is reserved to omit any item necessary to bring the total cost within budget provisions.

1. Correction of Mistakes: All entries must be in ink or typewritten. No erasures or corrective fluid permitted. Mistakes may be crossed out and corrections inserted adjacent. Corrections must be initialed in ink by person signing bid.

2. Signature on Invitation Required: "Invitation for Bid" shall be signed with the firm or corporate name and by an officer.

3. Return Instructions: Bidders must use the Bid form without alterations. Bids must be submitted sealed in an envelope, with the address of the School District on the outside of the envelope, company name and bid number, and bid opening date as they appear on the invitation. Pages on which there are no items to complete may be detached, and only those pages which contain entries or signature need be returned. Unsealed bids will be deemed unresponsive and rejected.

4. Pricing: Unit price will prevail in case of conflict between unit and total price. Unit price shall include total for equipment plus all accessories as per specifications.

5. Terms: All items listed are to be charged to the _____ (School name and complete address). Invoice date to be determined by the date of delivery unless otherwise agreed.

6. Payment Schedule: Three options: Board of Trustees should indicate by an "X" the option chosen.

() A. The School District will issue separate purchase orders for each item and will make payment within 10 working days following the next regularly scheduled Board meeting after delivery.

() B. The School District will issue separate purchase orders by building location and will make

payment within 10 working days following the next regularly scheduled Board meeting after installation.

() C. The School District will issue one purchase order for the entire amount of this bid and will make payment within 10 working days following the next regularly scheduled Board meeting after all work covered by purchase order is completed.

7. Do Not Combine Items: Bid on each item separately. Prices must be stated in units specified herein. Each item must be considered separately and not in combination with other items.

8. Delivery Prepaid: It is understood that the bidder agrees to deliver prepaid to location as indicated in specification. All costs for delivery, drayage or freight for the packing or unpacking of said articles are to be borne by the bidder.

9. Complying with Specifications: All materials furnished must be subject to inspection and approval by the School District after delivery. The right is reserved to reject and return at the risk and expense of the dealer such portion of any shipment which may be defective or fail to comply with specifications without invalidating the remainder of the order. If rejected, it will be held for disposition at the expense and risk of the dealer. Dealers will be requested to replace that defective portion of an order according to the specifications without additional cost of the _____ Public School.

10. Guarantee: Each bidder, by presenting a bid under these specifications, binds himself to make positive that all goods are fully up to the standards set by the specifications. Should it be discovered within a reasonable period of time from date of contract that such goods or services are up to standard, _____ District Schools shall have the right to have such goods or service replace by others conforming to the standard requirements and the entire expense shall be borne by the bidder.

11. Correctness of Bids: Bids shall be verified before submission, as quotations cannot be withdrawn after public opening. No bid can be corrected after being opened. The _____ District Schools will not be responsible for errors or omissions on bids.

12. Delivery Schedule: The successful bidder shall deliver the articles named in the specifications by delivery date as specified on the Invitation for Bid. Upon failure of the successful bidder to deliver all of the items ordered within the time set or allowed, the successful bidder will be considered in default.

13. Default and Delays: In case of default of the successful bidder, the _____ District Schools reserves the right to terminate the purchase order or contract and to purchase similar supplies, services, furniture, furnishing or equipment on the open market. The bidder will be charged with any cost occasioned by the _____ District Schools whether said cost is same as originally accepted or in excess of the original contract.

14. Bidder Qualifications: Before any contract can be awarded, a bidder must be deemed qualified, in the judgment of school district officials, to perform as required, herein. A bid will be rejected if a bidder fails to meet anyone of the following qualifications or supply any of the required documentation.

A. Product Line:

The bidder must demonstrate that it can provide all of the items on the bid list within the time frames specified in the Invitation for Bid.

Required Documentation:

1. The bidder must submit written documentation, such as inventory records, identifying the items that are to be delivered within (insert days for example: seven (7) working days) of bid award that are currently in inventory. Bidder must submit a signed statement certifying these items are not subject to prior sale.
2. For all other items, bidder must submit written documentation from the manufacturer, on manufacturer letterhead, that items will be delivered to bidder within (insert days; for example: twenty (20) working days) of bidder's order.

B. Financial Ability to Perform:

The bidder must demonstrate to school district officials that he/she has the financial ability to supply items to the school district as required.

Required Documentation:

1. Bidder must supply letters from all manufacturers/suppliers that will be used by bidder to service the contract that the bidder is in good standing with the manufacturer/supplier. Letters must be on the manufacturer/supplier's letterhead and signed by an authorized representative of the manufacturer/supplier and dated after the date of publication of this Invitation for Bid.

C. Reliability:

The bidder must demonstrate a record of successful prior service. For bidders with less than one year of experience, the bidder must demonstrate the ability to perform.

Required Documentation:

1. All bidders must complete the Attachment _ to the bid by listing all contracts exceeding (enter dollar amount for example: \$(DOLLAR AMOUNT) in aggregate during the past three (3) years) and that the bidder is in default or has not defaulted on the contract. Bidder will not meet the standard if bidder has been determined to be in default on any public entity contract exceeding \$(DOLLAR AMOUNT) in aggregate within the last three (3) years by a court of competent jurisdiction or recognized administrative appeal or hearings board, whether or not monetary damages were awarded. Bidder will not meet the standard if the bidder has defaulted on more than one nonpublic contract valued at more than \$(DOLLAR AMOUNT) during the past year.
2. Bidders with more than one year of experience must supply letters of satisfactory performance for contracts completed within the last twelve (12) months that are equal to or greater in value than the bidder's price for this invitation from 50 percent of the customers of such contracts, but not more than five (5) public entity customers and not more than five (5), commercial customers. These letters must be on the public entity's or commercial customer's letterhead and signed by the contracting official or designated representative.

3. Bidders with less than one year of experience must supply letters of satisfactory performance from all public entity's customers and letters from fifty (50) percent, but no more than five (5), commercial customers. These letters must be on the public entity's or commercial customer's letterhead and signed by the contracting official or designated representative.

D. Accounting Practices:

Responsible bidder shall possess the experience and ability to perform the necessary service for a complete and workmanlike installation of school nutrition program equipment.

Required Documentation:

1. Identification of the personnel by name and title who is to coordinate with other trades the proper equipment installation, including years of experience, technical and manufacturer training courses and certification received within the last three years.
2. Copies of warranty service authorization on manufacturer letterhead or via manufacturer certificates. Warranty authorizations/certificates must be currently valid. Authorizations or certificates which do not identify bidder's current eligibility are not acceptable.

Bidder must include dimensioned mechanical/electrical rough-in drawing. Bidder must provide on-site demonstration of equipment operation, service and maintenance within (insert days) after completion of installation.

III. SPECIAL INSTRUCTIONS

1. Start-Up - The bidder shall indicate in Section IV the name of company, agent, address and phone number of the party responsible for checking operation of equipment after final installation. If installation by party other than bidder, the District Schools shall be responsible for notifying specified agent that equipment is ready for start-up inspection. All start-up inspections should be completed within 10 working days of notification. Failure to provide this information will be considered reason for rejection of bid. A written report of results of start-up check shall be provided to the school district by agent listed in Section IV.
2. Demonstration – All equipment with moveable parts shall be demonstrated to school district nutrition assistants responsible for operation and care of equipment. Bidder shall indicate in Section IV the name of company, agent, address and phone number of party responsible for demonstration. If the agent is not an employee of the bidder, a letter shall be attached indicating willingness to provide demonstration. The Public School District shall be responsible for notifying agent that equipment has been installed and start-up check has been completed. Demonstration shall be provided within 10 working days of notification. Demonstration shall be conducted at a time agreeable to the school district at the site of actual equipment installation. Failure to provide this information will be considered reason for rejection of bid.
3. Dealer Warranty - In addition to the manufacturers' warranty the successful bidder shall guarantee for a period of one (1) year all items and equipment furnished under this bid. The warranty shall begin on the date the owner has accepted the start-up report or the owner has notified the successful bidder that start-up is complete. The conditions of the warranty shall be as follows:

A. Non-Refrigerated Equipment

1. Start-up and calibration
2. All parts that are integral with the equipment when purchased and all loose parts furnished with the equipment
3. All labor and mileage
4. If at any time during the warranty period, the equipment fails to function due to problems not related to the equipment, the dealer will charge the owner for the service call
5. Any parts or function of the equipment that fails to perform due to misuse or abuse voids the warranty and the dealer will charge the owner, owner must perform routine cleaning procedures

B. Refrigerated Equipment

1. All of the above, plus: five (5) year compressor warranty.

4. Factory Authorized Service Agents - The bidder shall indicate in Section IV the name, address and phone number of a factory authorized service agency for each item specified. The factory authorized service agency shall be located within 250 miles of installation site. Providing this information is in addition to the dealer service required in No.3 above. A written statement from the manufacturer shall be attached to the bid indicating that this agent "is authorized to service its equipment. Factory authorized service agents shall abide by the code of ethics of the Commercial Food Equipment Service Association (CFESA). Failure to provide this information will be considered reason for rejection of bid.

5. Codes – All equipment must be constructed and installed in accordance with the National Sanitation Foundation Code. All equipment must be listed and approved, where applicable, for UL, AGA and ASME requirements and all other requirements as specified by local building codes, plumbing codes, fire codes and all other state and local codes. All foodservice equipment must bear the applicable seals.

6. Manuals – The Board of Trustees shall be provided three (3) copies of use/care manuals and illustrated parts list for all equipment with moveable parts. These manuals shall be provided within 10 days of installation.

7. Removal of Existing Equipment - Two options indicated by an "X" the option chosen.

() A. Successful bidder will be responsible for disconnecting existing equipment as follows:
_____ In addition, successful bidder shall disconnect and reconnect any existing equipment which must be temporarily moved for installation of new equipment.

() B. Board of Trustees will be responsible for disconnection and removal of existing equipment prior to scheduled installation date for new equipment.

8. Assembly - All equipment is to be uncrated, assembled, set in place and made ready for final connections. All debris accumulated with the delivery of equipment shall be removed. Foodservice equipment is to be cleaned and turned over in first class condition.

9. Installation - Two options - _____ School District should indicate by an “X” the option chosen.

() A. Bidder shall be responsible for all electrical, gas and plumbing connections. All installations shall be completed by an appropriate professional. _____ District Schools will provide appropriate utilities within six feet of installation location.

() B. _____ School District will be responsible for all electrical, gas and plumbing connections.

10. Pre-Approved Brand - If bidder comes to bid an “or equal” brand, proof of equality must be submitted 10 days prior to bid opening. Any and all variances in construction, design, performance and accessories from the item specified must be submitted in writing to contact person listed in “Invitation for Bid.” This information shall be submitted in addition to manufacturers cut sheet. Failure to obtain prior approval will result in rejection of bid. Addenda shall be issued by _____ District Schools to all pre-qualified bidders stating specification number, item name and alternate brand and model number approved. This addenda shall be issued five days prior to bid opening.

11. Specifications – Written description in the specification will prevail in case of conflict between written description and model number.

12. Alternate Bids – Bidders shall submit only one (1) bid per item specified.

13. On-site Visits and Field Measurements – Three options - _____ District Schools should indicate by an “X” the option chosen.

() A. When an on-site visit is indicated in specifications, bidder shall complete on-site visit prior to date of bid opening. Bidder shall attach to bid a signed statement from the contract person listed in “Invitation for Bid” affirming that on-site visit was complete.

() B. The successful bidder shall be responsible for taking all field dimensions which affect the equipment and installation thereof. At the time of taking field measurements, the successful bidder shall report to the contact person named in invitation any conditions which will prevent him/her from the execution of his/her work as outlined in specifications and installation instructions.

() C. District Schools assure the successful bidder that equipment can be delivered to installation site with no changes to existing entrances. District Schools assumes full responsibility for any cost associated with removal and replacement of framing on entrances in order to deliver and set in place equipment, and the cost of additional mileage and labor as a result of failure of the Board of Trustees to meet the requirements of this paragraph.

14. Customer Fabricated Equipment – Equipment shall be fabricated by a foodservice equipment fabricator who has the plan, personnel and engineering facilities to properly design, detail and manufacture high quality equipment. The bidder shall, by his signature on Invitation for Bid, indicate the equipment is to be fabricated by bidder personnel. If fabrication is to be subcontracted, bidder shall attach to bid submittal letter giving name and address of fabrication subcontractor.

Successful bidder shall submit shop drawings for custom fabricated equipment. Drawings shall be at a minimum 1/8” scale and include a plan view and front, rear, and side elevations. All drawing shall be fully dimensioned and all parts labeled as to materials and methods of construction. Shop drawings shall be approved by contract person listed on Invitation for Bid prior to start of fabrication.

Boilerplate

Note: The purpose of a boilerplate provided by the school district is to communicate expectations and general requirements for doing business with prospective bidders.

PART 1 GENERAL

1.01 Related Documents

A. Drawings, bidding requirements, contract forms and condition of the contract, including the Instructions to Bidders, General Conditions, Supplementary Conditions, and Division-01 Specification Sections, apply to work of this section.

1.02 Scope of Work

A. Provide all work as specified in this section and indicated on Contract Drawings.
B. All referenced manufacturer's requirements and specifications, and nationally recognized and accepted standards, and specifications shall be the latest addition unless specified otherwise and shall be used as they are applicable for products and craftsmanship incorporated in the Contract Drawings and this section only.

1.03 Quality Assurance

A. Quality shall mean the meticulous attention to the detail of installation and workmanship necessary for the assemblage of products in the highest grade of excellence by skilled craftsmen of the trade.
B. Equipment manufactured and fabricated shall be new, of the highest quality, perfect, and without flaws. To the extent available and practicable, standard stock models have been specified. This contractor shall provide the latest model at time of delivery.
C. All equipment shall be provided with accessories (gauges, safety valves, thermostats, etc.) as required by and installed in full compliance with the current rules and regulations of the local and state health authorities in which the project is located.
D. Utility connections have been set for the equipment indicated and specified. If manufacturers require additional or different utility services and connections, these additional or different utility service and connections shall be provided, paid for, and completely coordinated under this section.

1.04 Codes

A. All codes, regulations, interpretations, and rulings of enforcing agencies which govern any part of the work of this section shall be considered a part of the governing regulations. No extra charge will be paid for the providing of items or furnishing work which is required by the regulations even though such may not be specifically called for on the drawings or in the specifications. Should a conflict occur between these codes and equipment specified, the code takes precedence. Notification of the code variance shall be made to the architect.

1.05 Standards

A. Unless otherwise called for, comply with the following standards as applicable to the manufacturer, fabrication, and installation of the work in this section.

1. NSF Standards: Comply with National Sanitation Foundation (NSF) standards and criteria, and provide NSF "Seal of Approval" on each manufactured item and on items of custom fabricated work.
2. UL Standards: For electrical components and assemblies, provide either UL labeled products or, where no labeling service is available, "recognized markings" to indicate listing in the UL "recognized component index".

3. UL Standards: For exhaust system and fire control.
4. AGA Approval: For all gas fired equipment.
5. NFPA Standards: Comply with NFPA No. 96 for exhaust systems.
6. ASME Boiler and Pressure Vessel Code: Comply with ASME Boiler Code requirements for steam generating equipment, kettles, and steamers.
7. National Electrical Code: Comply with N.E.C. for electrical wiring and devices included with foodservice equipment.
8. State and local codes and requirements.

1.06 Related Work by Separate Contractors

- A. Concrete platforms, bases, depressions, and openings in the walls.
- B. All waste water, vents, gas, ducts, heating, ventilation, and air conditioning, steam, and condensate return lines, also the final connection to the foodservice equipment herein contained.
- C. Conduit, wiring, breakers, and connections to the foodservice equipment herein contained.

1.07 Submittals

- A. Within thirty (30) days after award of contract (before equipment is purchased) this contractor shall submit five (5) brochures of approval.
 1. One (1) piece of manufacturer's literature on each item contained in these specifications.
 2. One (1) separate type written sheet on each item containing model numbers, specifications, accessory numbers, sizes, mechanical, and electrical connections. All the items specified herein and arranged in numerical order.
 3. Provide the name and phone number of the authorized service agent for each piece of equipment.
- B. In addition to brochures, this contractor SHALL also submit manufacturer's detailed shop drawings for all built-to specification equipment, (i.e., exhaust hoods, walk-iris, dishwashers, etc.).
 1. Submittal shall be a reverse reading paper sepia and two (2) sets of bluelines or five (5) sets of bluelines.
 2. Submittal shall show details of sections at minimum $1\frac{1}{2}'' = 1' - 0''$, and plan and elevation at minimum $\frac{3}{4}'' = 1' - 0''$.
 3. Submittal shall include complete specification of all hardware, materials, and quality of workmanship.
- C. This contractor SHALL NOT redraw and submit equipment layout, mechanical, electrical, duct, depression, fabrication, or any other engineering drawings already detailed in these contract drawings in order to submit any revisions to fabrication details. Fabrication drawings shall be submitted as follows:
 1. One (1) reverse reading sepia and two (2) sets of bluelines or five (5) sets of bluelines.
 2. Each submittal using this format shall have title block, sheet numbers, logos, and dates replaced with equipment manufacturer's title block information.
 3. Revisions shall be made to these sepias with complete specifications attached for all substitutions.

1.08 Nameplates

- A. Nameplates shall be provided on each "buy-out" product identifying the product manufacturer, model number, serial number, and other identifying information for use in warranties and securing replacement parts.
- B. The nameplates may be on the back or bottom of small and portable equipment but on heavy, permanently installed equipment, the nameplate shall be visible without searching. Electrical equipment shall have plates giving electrical characteristics.

C. Nameplates shall fit snugly against the surface of the equipment, shall be no larger than necessary, shall be free of rough edges, and shall be attached in such a manner that it will not interfere with the sanitation of the equipment.

PART 2 - PRODUCTS

2.01 Mechanical Appurtenances Under This Section of the Specifications

A. Except as noted, otherwise specified, all faucets and hose bibbs shall be as manufacturer by the T & 5 Brass & Bronze Company, Fisher Faucets, or Chicago Faucets. Deck type faucets shall be model no. B-201 with lock down feature, back splash type faucets shall be model no. B-231-CC. Both faucets shall have a 12" swing spout and a model B-199 aerator. NOTE: above model numbers refer to T & 5, others must match.

B. Where standard faucets are specified in this section, said faucets shall conform to paragraph A above unless otherwise noted.

C. Provide rotary handle, quick opening wastes with 4" long tailpieces and connected rear overflows on each sink compartment unless otherwise specified.

D. All equipment operation valves shall be installed at the job in an accessible location for the operator of the equipment.

E. Provide vacuum breakers with foodservice equipment where required by governing regulations, including locations where water outlets are equipped for hose attachment.

F. A shut-off valve shall be provided and installed by general contractor in the water supply connection to sinks, ice makers, and other pieces of equipment. Where two (2) or more units are connected to a single line and running to a common waste drain or floor drain, an accessible cleanout plug at the inlet of the line and/or at each 90° turn shall be provided by the general contractor.

G. Where exposed or semi-exposed, provide bright chrome-plated brass or polished stainless steel hardware. Provide copper or brass where not exposed.

H. Pressure vessels shall be inspected by the State Boiler Inspector, and shall receive his/her approval before use. All vessels shall have a pressure relief valve, a pressure reducing valve, temperature, and pressure gauge and shall have the temperature maintained by an automatic thermostat. All steam lines shall be properly insulated to meet or exceed ASH RAE 90-80 requirements and any local code requirements.

I. Verify type, BTU/Hr, specific gravity and pressure of gas to be used for all gas appliances.

J. Provide as part of this section of these specifications, gas pressure regulator valves and disconnect hoses for all gas operated appliances.

2.02 Electrical Appurtenances Under This Section of the Specifications

A. The contractor shall verify that the voltage on the job corresponds with the equipment drawings and specifications before ordering any electrical equipment. All equipment shall be grounded.

B. Motors 1/3 h.p. and less shall be 120/60/1, a.c.

C. Except where noted otherwise, motors V2 h.p. and over shall be wired for 208/60/3, a.c. motors shall have thrust type bearings so motors can operate in vertical position, shall be totally enclosed, 55° rise above 40° ambient, continuous duty. Motors shall have low torque starting current characteristics, with NEMA frames.

D. Plugs for 120/60/1 shall be Hubbell, Arrow Hart, or P&S safety grip type.

E. Plugs for 208/60/1 or 3 or above, shall match the receptacles specified under Division 16.

F. Receptacles for equipment specified shall be Hubbell, Arrow Hart, or P&S grounding type, three pole receptacles to receive plugs called for previously. Units shall be mounted in type "FS" box enclosures with stainless steel face plates and boxes where receptacles are exposed.

G. Thermostats not otherwise specified under individual items shall be as manufactured by Fulton, Powers, or Robert Shaw and shall be provided at all bain-maries, coffee urns, dishwashers, hot food tables, counters, and heated cabinets.

H. Controls, thermostats, starters, switches, and contractors furnished under this section of the specifications shall conform to the following:

1. Units which are an integral part of equipment shall be factory installed. Units which are to be separately mounted other than on equipment structure shall be installed on the job site under Division 16 of these specifications.
2. Starters for 120/60/1 shall be manual tumbler type, having thermal overload protection, with interchangeable heater elements.
3. Magnetic starters for 208/60/3 shall be size 1, line voltage type with three thermal overload relays for normal operation by automatic control or 120/60/1 phase push button station. Enclosure shall have overload reset and 120-volt control circuit.
4. All motors for remote control shall have magnetic starters regardless of horsepower or rating.
5. Cords and plugs for portable items shall be three wire or four wire type "S" as specified, all rubber cord with one leg grounded to the framework of the equipment. All wiring in or between foodservice equipment shall be run in Sealtite® conduit.

I. Lights which are integral parts of equipment such as incandescent lights under protector guards, lights under hoods, etc., shall be provided with bulbs.

2.03 Ventilation Appurtenances Under This Section of the Specifications

A. Coordinate with Division 1500. The hoods and ventilation systems and work by the fabricators of these exhaust systems shall comply with:

1. Recommendations of the National Fire Protection Association in NFPA No. 96 "Vapor Removal From Cooking Equipment, 1984".
2. National Sanitation Foundation's recommendations Standard No.2 for foodservice equipment.
3. Underwriter's Laboratories Standard for safety, file 192 "Grease Extractors for Exhaust Ducts UL 710, and file number E34091." Report on component industrial control equipment auxiliary devices.
4. State and local codes and requirements.

2.04 Fabrication Standards

A. Stainless steel:

1. Unless specified otherwise, stainless steel shall be USS (U.S. Standard) AISI type 302/304, 18-8 chromium/nickel with a maximum of .08 content of carbon; hardest workable temper, no. 4 directional polish. Stainless steel sheet shall be stretched, leveled, and cold rolled.
2. Stainless steel tubing and pipe shall be true round unless specified otherwise, seamless, or welded to appear seamless. Welded tubing shall be properly heat treated and quenched, to prevent carbide precipitation.

B. Galvanized steel:

1. Sheet: ASTM A 526, except ASTM A 527 for extensive forming: ASTM A 525, G90 zinc coating, chemical treatment.
2. Pipe: ASTM A 53 or ASTM A 120, welded or seamless.
3. Structural members: ASTM A 124 hot-dipped zinc coating, applied after fabrication.
4. Where painted finish is indicated, provide mill phosphatized treatment in lieu of chemical treatment.

C. Steel:

1. Sheet: ASTM A 569 hot rolled carbon steel.
2. Structural members: hot rolled or cold formed carbon steel.

D. Aluminum:

1. Sheet, plating, and extrusions, as indicated, ASTM B 209/B 221; alloy, temper and finish as determined by manufacturer/ fabricator, except OAO mil natural anodized finish on exposed work unless another finish is indicated or specified.

E. Sound Deadening:

1. Underside of metal work surfaces, including tables, drainboards, countertops, sink, and similar units shall have a coating of sound deadening material comprising of a heavy bodied resinous coating filled with granulated cork or other resilient product and compounded for permanent, non-flaking adhesion to metal in a thick coating. The coating shall end 3" from edges which are open for cleaning. Finish with aluminum lacquer.

F. Jointing Products:

1. Gasket: solid or hollow, but not cellular neoprene or polyvinyl chloride; light gray, minimum of 4 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.
2. Sealant: One part or two-part, polyurethane or silicone based, liquid elastomeric sealant, non-solvent release type, mildew resistant, Shore A hardness or 30, except 45 if subject to traffic.

G. Paint and Coatings:

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with foodservice, and which are durable, non-toxic, non-dusting, non-flaking, heat resistant, mildew resistant, and comply with governing regulations for foodservice.
2. Pre-treatment: SSPC-PT2 or PT2, or Federal Specifications TI-C-490 as is best suited for the metal being treated and the paint or coating to be applied.
3. Primer: Shall be the best suited for the metal to be primed and the paint or coating to be applied and shall be suitable for baking.

H. Field joints shall be located for practical construction and consistent with sizes convenient for shipping and accessibility into the building. All field joints in top shall be carefully sheared with sharp edges removed so they can be tightly butted and drawn together to leave a hairline joint. They shall be constructed as follows:

1. Two (2) channels shall be welded to the underside of the top of the same material and gauge as called for in top specifications. Channels are 1 ½" x 1" x 1 ½". One shall set back from the edge; the other shall extend beyond the edge to form a flat surface for aligning the meeting piece.
2. The underside of the top that overlaps the one (1) channel shall be provided with stud bolts on 2 ½" centers, and the top surface of the channel shall be perforated to receive same.
3. The abutting vertical members of the channels shall be perforated and provided with 5/16" bolts on 4" centers. When the bolts in the channel and the studs are drawn tightly, both vertical and horizontal tension shall be provided to hold the top secure and level.
4. Joints shall be welded, ground smooth and polished.
5. A die-formed end capping of the same material as the tabletop shall be applied to the exterior of the turned up edge on dish tables, sink drainboards, or other fixtures with raised rims to conceal the ends of the channels.

I. Where plumbing is required to pass through an enclosed base of a table or counter, such piping shall be enclosed in a suitable pipe chase with easily removable access panels. These access panels shall be slightly recessed and removable without tools.

J. Where plumbing and supply piping pass through shelves on open base tables, the pipe chases and shelves shall be neatly punched, die-stamped to include knockouts elevated around opening. Flange up for knockouts shall be $\frac{1}{2}$ " minimum.

K. Provide all scribe and filler strips, etc. for items recessed or furred. Provide and install escutcheons or panels to completely seal around all openings where pipe, ductwork, or conduit penetrate walls or bottoms of equipment units.

L. Pipe legs supporting equipment, tops, and sinks shall be constructed of 1 5/8" O.D., 16 gauge seamless stainless steel tubing. Furnish each leg with a stainless steel fully enclosed round gusset and an adjustable stainless steel bullet type foot (adjustment being internal). Furnish cross rails between all pipe legs. Cross rails shall be 1 5/8" O.D. of same material as pipe legs and welded to the legs.

M. Tops of work surfaces shall be of 14 gauge stainless steel with a 2" turndown on all exposed sides. Where the top is adjacent to a wall or high adjoining equipment, it shall have a turnup on a $\frac{3}{4}$ " radius of 8 $\frac{3}{4}$ ", a 1 $\frac{1}{4}$ " turn back on 45 degree angle, a 1" horizontal turn back and a $\frac{1}{2}$ " turndown toward the floor. Close all ends of backsplashes. Tops shall be constructed as follows:

1. Fabricate metal work surfaces by forming and welding to provide seamless construction, using welding rods, matching sheet metal, grinding and polishing.
2. In forming the sheeting, remove burrs from sheared edges of metal work, ease the corners, and smooth to eliminate cutting hazard. Bend sheets of metal at not less than the minimum radius required to avoid grain separation in the metal. Maintain flat, smooth surfaces without damage to finish.
3. Welds shall be strong, ductile, with excess metal ground off and finished smooth, and polished to match adjacent surface. Welds shall be free of imperfections such as pits, runs, splatters, cracks, etc., and shall have the same color as adjacent sheet surfaces.
4. Field joints may be provided in the top only where necessary and these shall be constructed as hereinbefore specified.

N. Reinforce work surfaces 30" o.c. maximum, both ways with galvanized or stainless steel concealed structural members. Reinforce edges which are not self-reinforced by formed edges. Reinforce metal at locations of hardware, anchorages, cutouts, and accessory attachments, wherever metal is less than 14 gauge or requires mortised application. Conceal reinforcements to the greatest extent possible.

O. Where fasteners are permitted, provide Phillips head, flat, or oval head machine screws. Cap threads with acorn nuts unless fully concealed in inaccessible construction; and provide nuts and lock washers unless metal for tapping is at least 12 gauge. Match fastener head finish with finish of metal fastened.

P. Where components of fabricated metal work are indicated to be galvanized, and involved welding or machining of metal heavier than 16 gauge, complete the fabrication and provide hot-dip galvanizing of each component after fabrication. Comply with ASTM A 123.

Q. Sink Construction:

1. Sinks shall be of 14 gauge stainless steel, all welded construction, with a formed continuous top edge. Drainboards shall be built as an integral part of the sink and have the same top edge and backsplash. Repolish all backsplashes and top to have grain running in the same direction.
2. Where adjacent to a wall, the rear of the sink shall be provided with a backsplash identical to that specified under Paragraph M above.

3. Except where otherwise noted, each sink shall be fitted with a 2" rotary type waste with a chrome plated strainer and a connected rear overflow.
4. Where sinks are set side by side, the cross partitions shall be double wall with air space between them. All interior corners, including the partitions, shall be covered on a minimum of 5/8" radius. Multiple sinks shall be provided with continuous seamless front.
5. Faucets shall be furnished for each sink compartment unless specified differently at multiple sink compartments.

R. Drawer Standards:

1. All drawers shall have a removable drawer pan stamped in one (1) piece with all corners coved. The drawer pans shall be a minimum of 20" x 20" x 5" deep and be constructed of 20 gauge stainless steel.
2. All drawers shall be enclosed on both sides, rear, and bottom with 18 gauge stainless steel, and welded to form one (1) piece vermin proof unit.
3. Provide a double pan, 16 gauge stainless steel drawer face with integral pull for each drawer.
4. When drawers are in a tier of three (3), the bottom drawer shall occupy the balance of the available height with the upper drawers both being 5" deep.
5. All drawers shall be self closing and operate on sanitary antifriction type steel runners with nylon ball bearing rollers.
6. Provide all drawers with padlock hasps as shown on drawings. Padlocks shall be furnished by owner.

S. Cabinet Standards:

1. Fixtures with enclosed cabinet type bodies shall be constructed of 18 gauge stainless steel. Interior walls shall be of 18 gauge stainless steel. Vertical style channels shall be welded. Access panels shall be lift out type, giving access to chase ways and shall be of minimum 18 gauge stainless steel.
2. All shelving inside equipment shall be of minimum 18 gauge stainless steel. In specifying number of shelves, the bottom shall be considered as one. All bottom shelves extend forward, turndown flush with the front facing of the cabinet. All interior shelves shall have a 1 1/2" turnup at rear and ends with edges beveled and made to hug the interior of the cabinet body. All welding shall be ground smooth and polished.
3. All sliding doors shall be full height, formed pan shaped with flush facing front and back, braced internally to prevent twisting and shall have sound proofing material internally applied. Exterior faces of door shall be of 18 gauge stainless steel and interior faces of door shall be of 20 gauge stainless steel. Doors to operate on nylon or stainless steel ball bearing rollers running in concealed overhead tracks and having concealed stainless steel guide pins in the sill at the bottom. Doors shall lift out and have a drop at the end of the closing run to hold them closed.
4. Hinged doors shall be double pan construction. Exterior shall be of 16 gauge stainless steel and interior of 18 gauge stainless steel. Doors shall be flush mounted without overlap. One side of the door shall have a 1/4" diameter pin at the top and bottom with nylon bushing to fit into the cabinet body and pivot the door. Provide door with a recessed pull on the exterior and a friction catch on the interior. Door shall have sound deafening material applied to the interior.

T. Abutting joint between equipment items and between items of equipment and wall where less than 3/8" shall be sealed with silicone sealant. Where greater than 3/8", joints shall be filled with stainless steel trim strips.

U. Electrical outlets into items shall be furnished as complete assembly of box, block, plate, and be ready for wiring. Plates shall be stainless steel. Provide a chase way for the conduit and wiring in cabinet base fixtures.

V. Where threads of bolts and screws on the inside of fixtures come in contact with wiping cloth, they shall be capped with a lock washer and acorn nut. Wherever bolts are welded to the underside of trim or tops, the reverse side of the welds shall be polished. Depressions at these points will not be acceptable.

W. Each piece of equipment shall bear a name plate which shall be fastened to the equipment. Each piece of electrical equipment shall bear a plate showing complete electrical characteristics which shall comply in all particulars with the current available at the building.

X. On the tables not adjacent to wall with electric or plumbing connections necessary for operation, provide two (2) flange type feet and bolt to the floor with non-rusting screws and floor anchors.

2.05 Walk-in Refrigerator and Freezer Standards

A. All interior and exterior surfaces, except the floor and ceiling, shall be of .042" thick stucco embossed aluminum unless otherwise specified. All interior ceilings shall be mill baked white polyester finish on galvanized steel.

B. Walls, floors, and ceiling shall be 4" thick unless specified otherwise and insulated with urethane insulation having a "K" factor of 0.13 and capable of holding temperature as low as minus 40 degrees at a 4" wall thickness.

C. Doors:

1. Doors shall have a clear door opening of 34" x 78" high. Doors shall be located in 46" or 69" wide panels. Doors shall be constructed of stainless steel on interior and exterior with tempered glass observation window in coolers to meet or exceed OSHA requirements.
2. Doors shall be offset type having two (2) heavy duty hinges, pull handle, a cylinder lock, a door closer, and safety handle on the interior. All hardware shall have a satin aluminum finish or chrome plated.
 - a. Provide on the sides and top, a thermal plastic gasket easily removable. At the bottom edge of the door, furnish an adjustable rubber wiper gasket. Gasket shall be resistant to oil, fats, water, and sunlight.
 - b. Doors shall be insulated with 4" of urethane as specified for the walls.
 - c. Construction of the door panels shall be identical to that of the walls, and shall include a heavy U-channel type reinforced steel frame around the entire perimeter of the door opening to prevent rocking and twisting. Furnish installed in the frame, an antisweat heater wire, completely encircling the door opening.
 - d. Doors to have 3/16" aluminum diamond tread plate on each side, to be 36" high off of floor.
 - e. Aisles to have non-skid strips.
3. Adjacent to the opening side of door, approximately 5'-0" above the floor, furnish a heavy-duty chrome plated, 5" diameter dial thermometer or a digital readout minimum 1/2" high. Thermometer shall be flush with the wall and have a recalibration feature.
4. Adjacent to the thermometer, mount a light switch with bull's eye. Switch shall be prewired to lights mounted in the ceiling of the walk-in and to the "J" box on top of the walk-in. Lights shall be wire protected, vapor proof, globe type with 150-watt bulbs. Lighting within walk-ins shall be a minimum of 25-foot candles on an even and equal basis.

5. In the ceiling of each walk-in freezer, furnish an air vent release.
6. Each section of the walls, ceiling, and floor shall have a tongue and groove, urethane edge. Panels shall be joined together by Rotolock joint fasteners built into the edges of the box. Install on both sides of the tongue, a twin pressure sensitive gasket. Fasteners shall operate by means of a hex wrench. Provide a full compliment of snap in covers for lock holes.

H. All interior corners shall be coved.

2.06 Errors and Omissions

A. It shall be the responsibility of the foodservice equipment bidders to inform the architect of any discrepancies found within these documents to include: written specifications, drawings, or schedules, to allow an opportunity for the consultant to prepare an addendum to correct such discrepancies. Bidding on a known discrepancy with the intention of equipment substitution or price gouging through change orders will not be tolerated.

B. Written itemized specifications shall take precedence.

Sample Fabricated Equipment Specification

ITEM NO. xx - POT WASHING SINK: 1 REQUIRED

- a. Fabricate and furnish one ea. pot sink with two drain boards. Requires ½" CW, ½" HW, 2" waste. Bowls to be 26 ½" x 24" x 14" deep. Overall size and shape as shown on plan.
- b. Sink constructed entirely of 14 gauge type 18-8 stainless steel with all vertical corners coved on a ¼" radius. The front, bottom, and back to be formed of one sheet with front and back having a ¾" roll. Partitions to be double wall and fully welded in place. Splash to be 8" high with 2 ½" return (10 ½" overall). Ends closed and welded. 1" diameter holes punched in splash for faucet. Two (2) ea. faucets to be Fisher, model no. 3253, heavy duty splash type with 12" swing spout. Supply three each lever handle waste, 2" brass with removable strainer, and rear connected overflow. Each compartment to have die-stamped star in sink bottom for drainage. Sink to be mounted on 1 5/8" O.D. 16 gauge stainless steel legs attached to fully enclosed stainless steel gussets welded to bottom of sink. Each leg to have an adjustable stainless steel bullet foot. To be 14" depth at partitions. Drainboards to be same material and finish as sink with back splash a continuation of sink splash. Front and end rims to be approximately 3" high terminating in a 180° roll on a ¾" radius.
The drainboard is to be constructed with a pitch to drain into the sink. Back splash and front rim are not to be pitched, but to continue level. Drainboards to be supported on 1 5/8" O.D. 16 gauge stainless steel legs attached to fully enclosed stainless steel gussets welded to stainless steel channel reinforcing on underside of drainboard. Each leg to have an adjustable stainless steel bullet foot.
- c. Splash mounted pot rack to be constructed of 2" x ¼" thick stainless steel flat bar fully welded to 1 5/8" O.D. 16 gauge stainless steel legs, extended thru splash, and secured to sink frame. Unit to be supplied complete with double pointed, sliding pot hooks at 6" on center.
- d. Refer to fabrication drawings for details.

