

FC 4-722-01N
1 December 2013

FACILITIES CRITERIA (FC)

NAVY AND MARINE CORPS DINING FACILITIES



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U.S. ARMY CORPS OF ENGINEERS

NAVAL FACILITIES ENGINEERING COMMAND (Preparing Activity)

AIR FORCE CIVIL ENGINEER CENTER

Record of Changes (changes are indicated by \1\ ... /1/)

Change No.	Date	Location

This FC supersedes FC 4-722-01N, Navy and Marine Corps Dining Facilities, dated 1 May 2013

FOREWORD

Facilities Criteria (FC) provide functional requirements (i.e., defined by users and operational needs of a particular facility type) for specific DoD Component(s), and are intended for use with unified technical requirements published in DoD Unified Facilities Criteria (UFC). FC are applicable only to the DoD Component(s) indicated in the title, and do not represent unified DoD requirements. Differences in functional requirements between DoD Components may exist due to differences in policies and operational needs.

All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the most stringent of the FC, the SOFA, the HNFA, and the BIA, as applicable.

Because FC are coordinated with unified DoD technical requirements, they form an element of the DoD UFC system applicable to specific facility types. The UFC system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applicable to the Military Departments, Defense Agencies, and the DoD Field Activities. The UFC System also includes technical requirements and functional requirements for specific facility types, both published as UFC documents and FC documents.

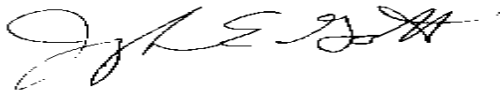
FC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and the Air Force Civil Engineer Center (AFCEC) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: [Criteria Change Request](#). The form is also accessible from the Internet site listed below.

FC are effective upon issuance and are distributed only in electronic media from the following source:

- Whole Building Design Guide web site <http://dod.wbdg.org/>.

Refer to UFC 1-200-01, *General Building Requirements*, for implementation of new issuances on projects.

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FACILITIES CRITERIA (FC) NEW SUMMARY SHEET

Document: FC 4-722-01N, Navy and Marine Corps Dining Facilities, dated 1 December 2013.

Superseding: FC 4-722-01N, Navy and Marine Corps Dining Facilities, dated 1 May 2013

Description of Changes: This FC incorporates revisions to building requirements from Navy and Marine Corps Dining Facilities program management and technical personnel. Revisions were made to ensure efficient operation of dining facilities, as well as efficiency and durability of building systems and features. Criteria references were also updated to the latest versions.

Reasons for Document: This FC contains the criteria for determining the appropriate size and complexity of Dining Facilities. It also provides non-Government standard resources that provide guidance in the design of Dining Facilities.

This document also contains requirements for dining facilities that are specifically designated as austere by CNIC. The requirements are located in Appendix C of this document.

Impact: Cost impacts are negligible.

Unification Issues: The following are issues that remain non-unified and the reasoning for each:

Navy and **Marine Corps** (MC) have differing Dining Facilities programs. There are differences noted in this document that are attributed to the Dining Facility program specifics. Most of the programmatic differences are indicated in the text of this document or on the Functional Program Tables. These differences are a part of either the **Navy** or **Marine Corps** Dining Facility program and listed as optional or not required by other Service. Where **Navy** or **Marine Corps** dictate program differences that affect the facility design, it is indicated within this document.

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION	1
1-1 SCOPE	1
1-2 APPLICABILITY.....	1
1-3 GENERAL BUILDING REQUIREMENTS.	1
1-4 AUSTERE DINING FACILITIES.....	1
1-5 DISTRIBUTION OF RESPONSIBILITIES.	1
1-5.1. Navy.	1
1-5.2. Marine Corps.	2
1-6 COORDINATION.....	2
1-6.1. Design Professionals.	2
1-7 SCOPE OF FACILITY.	2
1-8 REFERENCES.	3
1-9 GLOSSARY.....	3
CHAPTER 2 PLANNING AND LAYOUT.....	5
2-1 FOOD SERVICE PLANNING DETERMINATIONS.....	5
2-1.1 Number of Personnel to be Served.....	5
2-1.2 Meal Schedule and Duration.....	5
2-1.3 Payment.....	5
2-1.4 Food Delivery and Eating Methodology.	5
2-1.5 Menu.....	6
2-1.6 Staffing.....	6
2-1.7 Bussing.....	6
2-1.8 Other Facility Functions.	6
2-1.9 Mass Care Feeding Facility.	6
2-2 FUNCTIONAL SPACES.....	7
2-2.1 Entrance Lobby.....	7
2-2.2 Queue.....	7
2-2.3 Serving Area.	7
2-2.4 Cashier Station.	7
2-2.5 Dining Area.....	7
2-2.6 Public Toilets.	8
2-2.7 Dish/Pot-Washing.....	8

2-2.8	Kitchen and Preparation Areas.	8
2-2.9	Storage.	8
2-2.10	Loading Dock.	8
2-2.11	Support Areas.	8
2-2.12	Other Facility Functions.	8
2-2.13	Building Services Areas.	8
2-2.14	Trash & Garbage Removal and Recycling.	9
2-3	SIZE OF FACILITIES.	9
2-3.1	Navy and Marine Corps.	9
2-4	SPACE PROGRAMS.	9
2-4.1	Navy and Marine Corps.	9
2-5	BUILDING SITE.	14
2-5.1	Location.	14
2-5.2	Natural Light.	14
2-5.3	Separate Service Functions.	14
2-5.4	Patron Circulation.	14
2-5.5	Outdoor Dining Area.	14
2-6	BUILDING LAYOUT.	14
2-6.1	Flow Schematic.	14
2-6.2	Functional Planning.	15
2-6.3	Separate the Dining Area.	16
2-7	BUILDING DESIGN.	16
2-7.1	Design for Flexibility.	16
2-7.2	Aesthetics and Visual Image.	16
2-7.3	Glazing.	17
2-7.4	Design for Quality Work Environment.	17
2-7.5	Design for Durability and Maintainability.	17
CHAPTER 3	DESIGN CRITERIA.	19
3-1	GENERAL.	19
3-1.1	Authorized Building Program.	19
3-1.2	Accessibility.	19
3-2	SUSTAINABILITY.	19
3-3	FOOD CODE.	19

3-4	STRUCTURE.....	19
3-5	ARCHITECTURE AND INTERIOR DESIGN.....	20
3-5.1	General.....	20
3-5.2	Coordination.	20
3-5.3	Materials and Finishes.....	20
3-6	SERVICES.....	22
3-6.1	Plumbing.....	22
3-6.2	Heating, Ventilating, and Air Conditioning (HVAC).	24
3-6.3	Fire Protection and Life Safety.....	26
3-6.4	Electrical Design.....	26
3-7	EQUIPMENT.	27
3-7.1	Walk-In Refrigeration/Freezer.....	27
3-7.2	Cashier's Safe.	27
3-8	SITE WORK.	27
3-8.1	Landscape.	28
3-8.2	Parking, Access Drives, and Other Site Features.....	28
APPENDIX A REFERENCES.....		29
APPENDIX B BEST PRACTICES		31
B-1	INTRODUCTION.	31
B-2	GENERAL BUILDING DESIGN.	31
B-2.1	Acoustics.	31
B-3	QUEUE.....	31
B-4	DINING AREA.	32
B-5	SERVERY.....	32
B-6	FOOD SERVICE AREAS.	32
B-7	FOOD SERVICE EQUIPMENT.	34
B-7.1	Sample Equipment Schedules.....	34
B-7.2	Vibration.....	36
B-7.3	Utilities.	36
B-8	STAFF FACILITIES.....	37
B-8.1	Staff Toilets.....	37
B-8.2	Staff Lockers.....	37
B-9	PLUMBING DESIGN.....	37

B-9.1	Sanitary Waste Piping.	37
B-10	HVAC DESIGN.....	37
APPENDIX C AUSTERE DINING FACILITIES		39
C-1	PURPOSE.....	39
C-2	DEFINITION AND SCOPE.....	39
C-3	APPLICABILITY.....	39
C-4	MODIFICATIONS.....	39
APPENDIX D GLOSSARY		47

FIGURES

FIGURE 2-1 DINING FACILITY FLOW SCHEMATIC	15
FIGURE B-1 STORAGE ACCESS DIAGRAM	34

TABLES

TABLE 2-1 PERSONNEL TO BE SERVED BY MISSION.....	9
TABLE 2-2 ESTIMATED STORAGE REQUIREMENTS	11
TABLE 2-2A NAVY SPACE PROGRAM	12
TABLE 2-2B NAVY SPACE PROGRAM	13
TABLE 3-1 INTERIOR FINISHES	21
TABLE B-1 NAVY CONCEPTUAL EQUIPMENT LIST.....	35
TABLE B-2 STAFF LOCKER COUNT	37
TABLE C-1 PERSONNEL TO BE SERVED BY MISSION	40
TABLE C-2 AUSTERE ARCHITECTURAL FINISHES	42
TABLE C-3 NAVY CONCEPTUAL EQUIPMENT LIST FOR AUSTERE FACILITIES.....	44

CHAPTER 1 INTRODUCTION

1-1 SCOPE.

This FC (Facilities Criteria) presents facility operation, programming, and sustainability information to guide the design and construction criteria for all Navy and Marine Corps enlisted dining facilities for both outside (OCONUS) and inside the continental United States (CONUS). Emphasis is placed on the design of functional and aesthetically pleasing food service facilities that help attract and retain service personnel. The information in this FC applies to the design of all new construction projects, to include additions, alterations, and renovation projects. It also applies to the procurement of design-build services. This FC is not intended as a substitution for thorough review by individual Program Managers and Operations Staff.

1-2 APPLICABILITY.

This FC applies to all military service elements and contractors involved in the planning, design, and construction of Navy and Marine Corps dining facilities. Programmatic differences are indicated through-out this FC document that are a part of either the Navy or Marine Corps dining program and listed as optional or not required by other Service. Comply with the Agency requirements that apply to the project.

1-3 GENERAL BUILDING REQUIREMENTS.

Comply with UFC 1-200-01, "General Building Requirements". UFC 1-200-01 provides applicability of model building codes and government-unique criteria for typical design disciplines and building systems, as well as for accessibility, antiterrorism, security, sustainability, and safety. Use this FC in addition to UFC 1-200-01 and the UFCs and government criteria referenced therein.

1-4 AUSTERE DINING FACILITIES.

Appendix C of this FC contains requirements for Dining Facilities that are specifically designated as "austere". Austere construction is intended for facilities in locations determined by CNIC and approved by OPNAV to be eligible for austere construction. The austere standards are intended to be applied flexibly and in varying degrees to all facilities at locations designated as austere. Flexibility is allowed to ensure the criteria are appropriate for individual austere locations.

1-5 DISTRIBUTION OF RESPONSIBILITIES.

1-5.1. Navy.

There are four participants in the development of Navy facility design. First, the local installation and facility manager identifies the need for a new, modernized, or enlarged dining facility and initiates the project development process. Second, the Naval Facilities Engineering Command sets the standards for developing the criteria and establishing the facility space requirements. Third, the Naval Supply Systems

Command sets the standard food service operations. Fourth, the management of the design and construction of Navy facilities is a joint effort of the Naval Facilities Engineering Command and the cognizant Navy Region.

Direct design questions regarding Navy projects to the following contacts:

- Office of the Chief Engineer, Naval Facilities Engineering Command, 1322 Patterson Avenue, SE, Suite 1000, Washington Navy Yard, DC 20374, telephone (202) 685-9167 or to the Commander, Naval Facilities Engineering Command Atlantic, 6506 Hampton Blvd Norfolk VA 23508-1278, telephone 757-322-8000 or visit the NAVFAC website at <http://www.navfac.navy.mil>.
- Commander, Navy Installations Command, Fleet and Family Readiness (N92), Galley Program Manager, 2713 Mitscher Road SW, Suite 200, Anacostia Annex, D.C. 20373-5802, telephone 202-433-4037.

1-5.2. Marine Corps.

Headquarters Marine Corps, Logistics Food Service, Code (LFS-4) manages policies, sets standards, and directs all food service operations within the Marine Corps. The design project manager is responsible for approval of design and construction. Each new mess hall facility will have a technical representative assigned by the activity Food Service Office to coordinate needs and requirements between Code LFS-4, the cognizant Naval Facilities Engineering Command component, and other activities as needed.

1-6 COORDINATION.

Prior to project development, coordinate the design team composition and facility requirements with the Service contacts provided in Chapter 1 paragraph titled, "Distribution of Responsibilities", and confirm the acquisition methodology.

1-6.1. Design Professionals.

The design team of record for dining facilities must include a food service consultant that is qualified as a member of Foodservice Consultants Society International (FCSI) or equal. This consultant's involvement will include, but not be limited to, developing specifications and schedules for all kitchen equipment including utility connection sizes and capacities for all applicable items, location of floor sinks and floor drains, and kitchen hoods. The design team must coordinate with Installation Food Service Team representatives.

1-7 SCOPE OF FACILITY.

Dining facility functional design is driven by the number of personnel to be served, meal schedule and duration, payment style, food delivery and eating methodologies, and any additional functions accommodated in the specific facility. These functions and how they drive the design of the facility are described in detail in Chapter 2 paragraph titled, "Food Service Planning Determinations".

1-8 REFERENCES.

Appendix A contains a list of references used in this document. The publication date of the code or standard is not included in this document. In general, the latest available issuance of the reference is used.

1-9 GLOSSARY.

Appendix D contains acronyms.

FC 4-722-01N
1 December 2013

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CHAPTER 2 PLANNING AND LAYOUT

Involve the Installation's Food Service Manager in the planning process to ensure new and renovated facilities meet the needs of the Installation. This document includes space calculation tabulations for dining facilities serving up to 2,200 personnel. If facilities are required to feed more than 2,200 personnel it is recommended to consider extending feeding hours or adding serving lines to accommodate additional throughput in lieu of constructing a substantially larger building.

2-1 FOOD SERVICE PLANNING DETERMINATIONS.

Planning the size and layout of dining facilities depends upon the following determinations.

2-1.1 Number of Personnel to be Served.

The number of personnel to be served drives the overall size of the facility (also see Chapter 2 paragraph titled, "Functional Spaces") per Chapter 2 paragraph titled, "Size of Facilities" and Chapter 2 paragraph titled, "Space Programs".

2-1.2 Meal Schedule and Duration.

The meal schedule and duration affects both the sizing and layout of the facility. The meal schedule may vary by Service, region, and Installation and must be determined as part of the planning process.

2-1.3 Payment.

The payment style affects the layout of the facility.

- Cafeteria style. Patrons pay a set meal price upfront at a check-in station and choose from predetermined options.
- A la carte. Patrons pick up individual menu items and pay only for the items selected at a check-out station at the exit of the serving area.

2-1.4 Food Delivery and Eating Methodology.

The food delivery and eating methodologies affect the size and layout of the facility. Dining facilities may accommodate more than one of the following methodologies:

- Serving Line or Station. Patrons choose from predetermined options off of serving lines or stations such as hot bar line, salad bar, deli bar, pizza bar, taco bar, etc. Food may be packaged for consumption in the facility or for takeout. Payment can be either cafeteria style or a la carte.
- Short order. Patrons order items for custom preparation. Food may be packaged for consumption in the facility or for takeout. Payment can be either cafeteria style or a la carte.

- Takeout/Meal Replacement. Patrons choose from assorted prewrapped and prepackaged items that may range from hamburgers and pizza to full meals. Payment is typically a la carte.

2-1.5 Menu.

Menu options, nutritional guidelines, and the required variety must be determined prior to design and must be coordinated with the food delivery and eating methodologies. These will be used to determine the needed preparation, serving and storage area sizes and the equipment.

2-1.6 Staffing.

Staffing requirements must be determined prior to design and will be used to size the administrative areas, staff lockers, and toilets.

2-1.7 Bussing.

The choice of contract/staff bussing or patron self-bussing is the option of the local command. Design facilities to accommodate both modes of bussing, which affects the facility layout. Bussing carts should be screened from view of the dining area.

2-1.8 Other Facility Functions.

The dining facility may accommodate one or more of the following additional functions:

- Field Feeding/Vat Chow. Dining facility prepares group meals for field consumption. This function includes storage of field preparation and serving equipment.
- Flight Kitchens and Box/Bag Meals. Dining facility prepares individual meals for field consumption. This function requires either storage of individual meal packaging or storage of commercially-prepared individually-packaged meals.
- Recreation Chow. Dining facility prepares special event group meals for consumption outside the facility.

2-1.9 Mass Care Feeding Facility.

Dining facilities may be designated as Mass Care feeding facilities if mission, region, and Installation requirements dictate. A Mass Care feeding facility is designed to remain operational after an emergency incident when other dining opportunities will not be available. This will significantly affect the project budget and requires classifying the building to meet a higher occupancy category per UFC 3-310-01, *Structural Load Data*. See Chapter 3 paragraph titled, "Structure", for more information. Also see Chapter 3 paragraph titled, "Electrical", for emergency back-up power requirements. Coordinate with the Installation Antiterrorism (AT) or emergency management plan.

2-2 FUNCTIONAL SPACES.

The food service planning determinations along with site conditions and other basic building design, operation, and Installation determinations establish the size, layout, and design of the facility functional spaces.

2-2.1 Entrance Lobby.

The entrance lobby is the main entrance to the facility, and the size is determined by the number of personnel to be served. Provide a canopy or enclosure for patrons who arrive in advance of the opening of the facility or where the line of patrons is anticipated to extend outside the facility. This function can be accomplished in the form of a vestibule.

2-2.2 Queue.

The queue is the space between the entrance lobby and the serving area and is determined by the serving capacity, the serving methodology, and the payment style.

2-2.3 Serving Area.

The serving area accommodates ordering and delivery of food to patrons and is determined by the food delivery methodology and the payment style. The design of the serving area impacts the serving capacity and must be coordinated with queue and dining area.

2-2.4 Cashier Station.

The cashier station accommodates patron payment, and the configuration, location and number of stations are determined by the number of personnel served, food delivery methodology, and the payment style. The cashier station must be able to accommodate payment options such as cash, credit, debit cards and ration-in-kind (RIK). Multiple electrical and data drops must be provided to allow for network connectivity, electronic menu board capabilities and other point-of-sale accountability requirements.

2-2.5 Dining Area.

The dining area accommodates patron eating and relaxation. It is determined by the number of personnel to be served and meal schedule and duration as expressed by turnover/serving capacity and seating capacity. The design must also be coordinated with the food delivery methodology and bussing approach.

2-2.5.1 Turnover/Serving Capacity.

Turnover is the number of times a dining area seat is occupied during a given period. Turnover drives the serving capacity, which is the number of patrons served within the set meal duration. The serving capacity is used to size the functional elements of the dining facility to ensure that the required number of patrons can be served in the meal duration. The serving capacity must be determined prior to design.

2-2.5.2 Seating Capacity.

Seating capacity is determined by considering the required serving capacity and the serving methodology. The seating capacity is used to size the dining area of the facility.

2-2.6 Public Toilets.

The public toilets are determined by the number of personnel to be served.

2-2.7 Dish/Pot-Washing.

The dish- and pot-washing areas are determined by the number of personnel to be served, bussing considerations, the food delivery methodology, and the menu.

2-2.8 Kitchen and Preparation Areas.

The kitchen and all food preparation areas are determined by the number of personnel to be served, the food delivery methodology, the menu, the bussing style and the storage capacities.

2-2.9 Storage.

Storage areas accommodate stocks of subsistence (consumables) and nonsubsistence, e.g., tableware, cleaning supplies. The areas are determined by analysis of the menu, the number of personnel to be served, and the defined delivery cycles.

2-2.10 Loading Dock.

The loading dock accommodates material transfer in and out of the facility and must be coordinated with storage requirements. Provide separate pathways to/from the loading dock for food delivery and trash removal.

2-2.11 Support Areas.

Support areas accommodate staff needs such as offices, training, cashier's office, other administrative tasks, toilets, lockers, and janitor closets. The areas are determined by the mission and staffing requirements. The cashier's office is used for counting money, contains the cashier's safe, and must have a have a cipher lock on the exterior door.

2-2.12 Other Facility Functions.

These spaces will be determined by the specific facility functions required as described in the paragraph of Chapter 2 titled, "Food Service Planning Determinations".

2-2.13 Building Services Areas.

These spaces accommodate building services such as mechanical, electrical, and communications.

2-2.14 Trash & Garbage Removal and Recycling.

Garbage removal and recycling systems will be determined prior to design.

2-3 SIZE OF FACILITIES.**2-3.1 Navy and Marine Corps.**

Determine the number of personnel to be served by multiplying the projected maximum unaccompanied housing occupancy by the utilization factors in Table 2-1. Include the average on-board count of ships entitled to rations in-kind while shipboard facilities are out of service in the projected occupancy. Do not include personnel on separate rations in the projected occupancy.

Table 2-1 Personnel to be Served by Mission

Mission	Utilization Factor
Training	
Basic and/or Recruit Training	95%
Service Schools	85%
Permanent Party	
Remote Locations*	90%
Naval Stations	70%
Construction Battalions	70%
Shipyards	70%
Weapon Stations	70%
Personnel Transfer and Overseas Processing Centers	50%
Brig	100%

* Defined as a location with minimal available other feeding sources, on or off Installation.

Note: Officers and civilians are only be included in the projected occupancy in overseas or remote locations where support is authorized.

The projected occupancy multiplied by the utilization factor equals the personnel served. The number of personnel served is used to establish the eight facility size classifications for dining facilities. See paragraph in Chapter 2 titled, "Space Programs", for facility areas by size classification. Additional space planning criteria can be found in UFC 2-000-05N (P-80), *Facility Planning Criteria for Navy/Marine Corps Shore Installations*, category code 722, *Bachelor Housing-Mess and Conference Facilities*.

2-4 SPACE PROGRAMS.**2-4.1 Navy and Marine Corps.**

Tables 2-2A and 2-2B identify functional areas in Navy dining facilities and provide a target space allotment for each functional area. The space requirements are minimums to be provided for the range of personnel to be served. These targets have been provided to serve as a guide to the planner and designer considering the noted

assumptions and are not restrictive. Actual gross allowable area for each project will be defined in the facility programming document DD Form 1391 for the specific project.

2-4.1.1 Space Program Assumptions.

The functional areas and associated space allotments identified in the Navy Space Program Tables reflect the assumptions below. Each project's areas and space allotments must be adjusted to align with the project-specific parameters.

- Preparation method is conventional cook-serve.
- Mission is basic or recruit training.
- Seating is based on 15 ft.² (1.4 m²) per seat.
- Lobby queuing, and circulation space is minimized.
- One serving line is needed for every 200 seats, with minimum of 2 lines.
- Baking operations are minimized and reflect minimum bake-off of pre-prepared dough or other items.
- Three meals per day are served, seven days per week.
- Dishwashing space reflects a rack dish machine.
- Bussing method is self-buss to remote dishroom.
- No provisions for catering are allocated other than Field Feeding/Vat Chow.
- Beverages are a free standing self-serve counter.
- Staff toilets do not include showers

2-4.1.2 Storage.

Storage area requirements typically range from 10 to 25% of the facility net area (public, preparation, serving and support areas) and include dry foods, refrigerated and frozen foods, consumables, and other non-food goods. Factors that influence the storage requirements are the method of preparation and the inventory period:

- Scratch preparation has different fresh, dry and refrigerated storage requirements from frozen convenience and pre-prepared preparation. The mix of preparation methods must be known to correctly size and design the storage areas.
- Inventory period is the time between deliveries. It will be influenced by the facility location (CONUS vs. OCONUS and rural/remote vs. urban areas), facility mission, and the vendor location and delivery contract terms. The longer the inventory period, the larger the storage requirements. On CONUS projects, provide storage space based on Inventory period of 7 to 10 days.
- Under normal CONUS conditions, the distribution of storage space type is 50% dry, 30% frozen and 20% chill.

See Table 2-2 for a generalized breakdown of these factors and how they impact the storage requirements.

Table 2-2 Estimated Storage Requirements

Inventory Period Factors	Food Preparation Factors	
	Frozen/ chill	Scratch
Often (urban)	10-15% of net area	15-20% of net area
Infrequent (rural/remote)	15-20% of net area	20-25% of net area

2-4.1.3 Net-to-Gross Multiplier.

The net-to-gross multiplier accounts for mechanical and other utility space, wall thicknesses and other construction requirements. It typically ranges from 15 to 25% of all net areas for dining facilities and is influenced by the mechanical system, the number of floors, and the overall layout and design of the building. However, the net-to-gross multiplier must be carefully considered in the planning and design process and extreme anomalies can occur. Some OCONUS projects have resulted in net-to-gross multipliers as high as 50%.

Table 2-2A Navy Space Program

Functional Components		Facility Size Classifications							
		1-80		81-150		151-250		251-400	
		Personnel Served		Personnel Served		Personnel Served		Personnel Served	
		62 Min. Seats		108 Min. Seats		116 Min. Seats		172 Min. Seats	
		1.3 Min. Turnover		1.4 Min. Turnover		2.2 Min. Turnover		2.3 Min. Turnover	
		ft. ²	m ²	ft. ²	m ²	ft. ²	m ²	ft. ²	m ²
Public Areas	Dining Area and Circulation	935	86.9	1630	151.4	1875	174.2	3000	278.7
	Public Toilets	180	16.7	200	18.6	220	20.4	250	23.2
	Queue	130	12.1	250	23.2	325	30.2	500	46.5
	Sign-in Station	40	3.7	40	3.7	40	3.7	60	5.6
	Subtotal	1285	119.4	2120	196.9	2460	228.5	3810	353.9
Serving Areas	Regular Food Line	250	23.2	320	29.7		0.0		0.0
	Fast Food Line		0.0		0.0		0.0		0.0
	Combination Food Line		0.0		0.0	420	39.0	620	57.6
	Beverage Line/Salad Bar	200	18.6	250	23.2	350	32.5	500	46.5
	Cashier Station	30	2.8	30	2.8	50	4.6	50	4.6
	Dish Washing	180	16.7	250	23.2	320	29.7	380	35.3
	Subtotal	660	61.3	850	79.0	1140	105.9	1550	144.0
Preparation Areas	Kitchen	650	60.4	800	74.3	600	55.7	845	78.5
	Vegetable Preparation		0.0		0.0	220	20.4	255	23.7
	Meat Preparation		0.0		0.0		0.0		0.0
	Bakery		0.0		0.0		0.0		0.0
	Utensil Wash		0.0		0.0	175	16.3	220	20.4
	Subtotal	650	60.4	800	74.3	995	92.4	1320	122.6
Support Areas	Offices	230	21.4	310	28.8	400	37.2	580	53.9
	Staff Toilets	260	24.2	260	24.2	260	24.2	260	24.2
	Staff Lockers		0.0		0.0	120	11.1	160	14.9
	Janitor's Closet	25	2.3	25	2.3	25	2.3	50	4.6
	Can Wash	40	3.7	40	3.7	40	3.7	40	3.7
	Loading Dock (at 50%)	200	18.6	200	18.6	200	18.6	230	21.4
	Subtotal	755	70.1	835	77.6	1045	97.1	1320	122.6
FACILITY SUBTOTAL		3,350	311.2	4,605	427.8	5,640	524.0	8,000	743.2
Storage ranges from 10 to 25% of Facility Subtotal									
Net-to-Gross ranges from 15 to 25% of Facility Subtotal									
Flight Kitchen*		100	9.3	100	9.3	100	9.3	100	9.3
FACILITY TOTAL		To be determined based on storage and net-to-gross		To be determined based on storage and net-to-gross		To be determined based on storage and net-to-gross		To be determined based on storage and net-to-gross	

* Not all locations will require a Flight Kitchen. A flight kitchen is a staging area where food products are assembled and packaged for delivery to aircraft.

Table 2-2B Navy Space Program

Functional Components		Facility Size Classifications							
		401-650		651-1000		1001-1500		1501-2200**	
		Personnel Served		Personnel Served		Personnel Served		Personnel Served	
		288 Min. Seats		345 Min. Seats		460 Min. Seats		575 Min. Seats	
		2.3 Min. Turnover		2.9 Min. Turnover		3.3 Min. Turnover		3.8 Min. Turnover	
		ft. ²	m ²	ft. ²	m ²	ft. ²	m ²	ft. ²	m ²
Public Areas	Dining Area and Circulation	4700	436.6	6320	587.1	7565	702.8	11000	1021.9
	Public Toilets	300	27.9	320	29.7	340	31.6	370	34.4
	Queue	750	69.7	1000	92.9	1100	102.2	1650	153.3
	Sign-in Station	80	7.4	100	9.3	120	11.1	120	11.1
	Subtotal	5830	541.6	7740	719.0	9125	847.7	13140	1220.7
Serving Areas	Regular Food Line	600	55.7	650	60.4	1050	97.5	1300	120.8
	Fast Food Line	600	55.7	650	60.4	650	60.4	650	60.4
	Combination Food Line		0.0		0.0		0.0		0.0
	Beverage Line/Salad Bar	650	60.4	700	65.0	810	75.2	1056	98.1
	Cashier Station	100	9.3	150	13.9	200	18.6	250	23.2
	Dish Washing	450	41.8	600	55.7	730	67.8	1032	95.9
	Subtotal	2400	223.0	2750	255.5	3440	319.6	4288	398.4
Preparation Areas	Kitchen	1000	92.9	1100	102.2	1285	119.4	1600	148.6
	Vegetable Preparation	300	27.9	350	32.5	360	33.4	600	55.7
	Meat Preparation		0.0	240	22.3	300	27.9	500	46.5
	Bakery		0.0	690	64.1	825	76.6	1035	96.2
	Utensil Wash	330	30.7	400	37.2	500	46.5	600	55.7
	Subtotal	1630	151.4	2780	258.3	3270	303.8	4335	402.7
Support Areas	Offices	700	65.0	700	65.0	700	65.0	900	83.6
	Staff Toilets	360	33.4	430	39.9	450	41.8	500	46.5
	Staff Lockers	260	24.2	380	35.3	380	35.3	480	44.6
	Janitor's Closet	50	4.6	75	7.0	75	7.0	100	9.3
	Can Wash	40	3.7	60	5.6	60	5.6	60	5.6
	Loading Dock (at 50%)	300	27.9	300	27.9	400	37.2	400	37.2
	Subtotal	1710	158.9	1945	180.7	2065	191.8	2440	226.7
FACILITY SUBTOTAL		11,570	1,074.9	15,215	1,413.5	17,900	1,662.9	24,203	2,248.5
Storage ranges from 10 to 25% of Facility Subtotal									
Net-to-Gross ranges from 15 to 25% of Facility Subtotal									
Flight Kitchen*		125	11.6	125	11.6	150	13.9	150	13.9
FACILITY TOTAL		To be determined based on storage and net-to-gross		To be determined based on storage and net-to-gross		To be determined based on storage and net-to-gross		To be determined based on storage and net-to-gross	

* Not all locations will require a Flight Kitchen. A flight kitchen is a staging area where food products are assembled and packaged for delivery to aircraft.

**Note: if facility is serving more than 2,200 personnel, consider extended feeding hours or adding serving lines to accommodate additional throughput in lieu of constructing a substantially larger building.

2-5 BUILDING SITE.

This facility will be a focal point of the local community. It should be an open and inviting gathering place for service personnel. Address the following factors in the site selection and design.

2-5.1 Location.

Locate the facility along the pedestrian paths to the existing barracks/dormitories and centralized support services. Accommodate patron access through the relationships to existing vehicular and pedestrian circulation patterns, bike trails, and bus stops. If served by shuttle busses, provide a Porte Cochere. Provide adequate parking as close to the facility as possible within antiterrorism (AT) requirements.

2-5.2 Natural Light.

Select a site to maximize the admission of natural light while minimizing heat gain through the glazing.

2-5.3 Separate Service Functions.

Separate service functions such as loading docks, maintenance yards, trash containers, on-grade mechanical equipment, and staff parking from the rest of the site by architectural screening, landscaping, or grading.

2-5.4 Patron Circulation.

Patrons arrive from many directions. Identify the various access points, both pedestrian and vehicular, and channel circulation to the entrance of the building. Encourage smooth circulation by landscaping and paving complementary to the building. Entry circulation begins as the patron enters the site and continues through the interior of the facility.

2-5.5 Outdoor Dining Area.

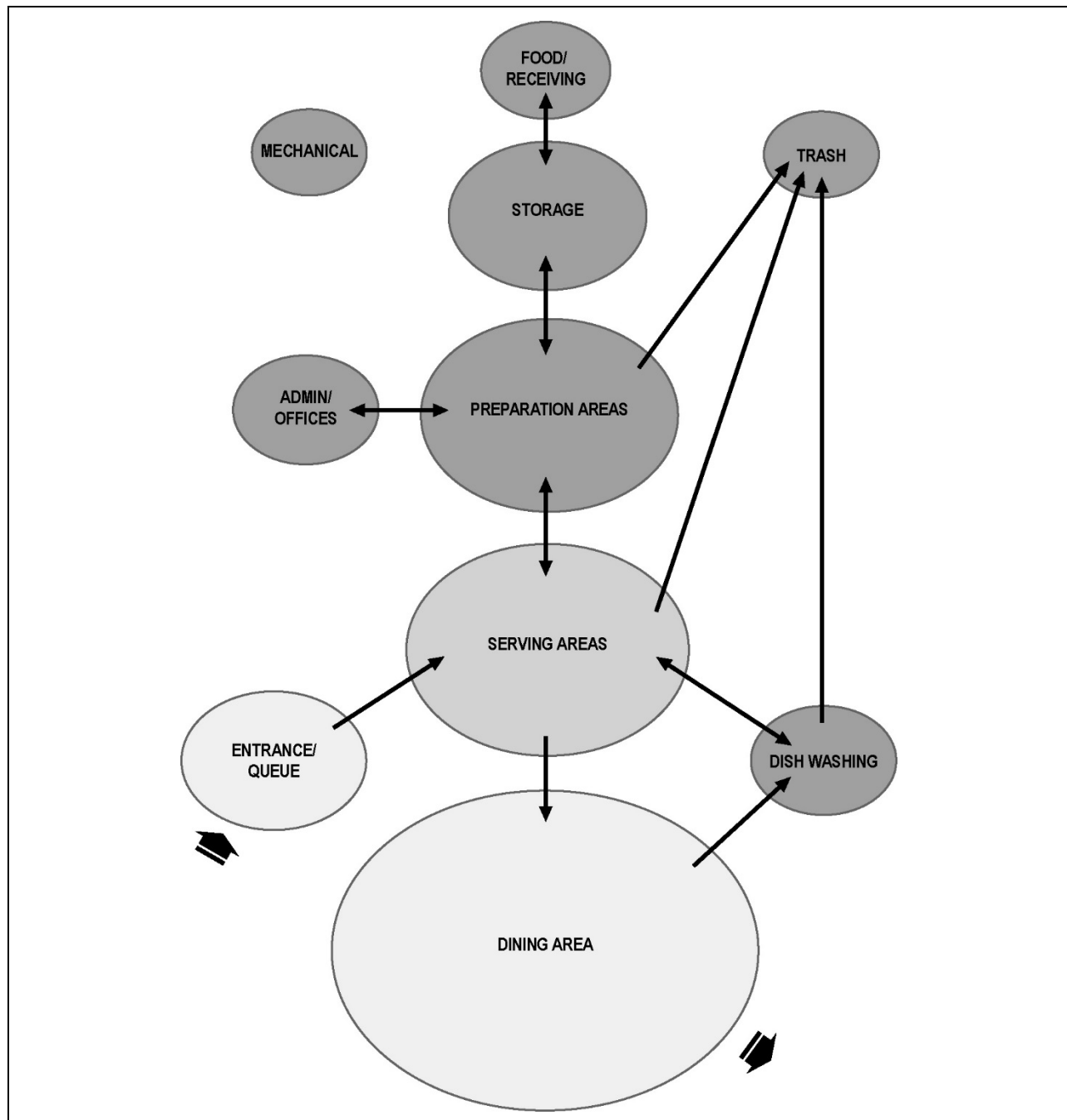
If the site and climate permits, provide an outdoor dining area,

2-6 BUILDING LAYOUT.

The building should be laid out to foster efficient flow of people, materials, and work activities. It should also visually and acoustically separate patron functions from food preparation and cleaning functions.

2-6.1 Flow Schematic.

Figure 2-1 schematically illustrates the building layout in terms of major functional areas and displays the flow of people and material.

Figure 2-1 Dining Facility Flow Schematic**2-6.2 Functional Planning.**

The relationship among the various storage, preparation, cooking, serving, and cleaning functions must be carefully studied to provide the maximum flow and efficiency. Keep travel distances short and minimize crossover of circulation paths. Maintain open sight lines as possible and utilize mobile food service equipment for flexibility. Provide utility connections for mobile food service equipment. Plan for various serving styles.

2-6.3 Separate the Dining Area.

The dining area represents the conclusion of the patron process of arrival, queuing, identification, serving, and payment. To the extent possible, separate seated patrons from the congestion and movement of arriving and departing patrons. To avoid congestion within the dining facility, patron circulation space at bussing area should be as large as possible.

2-7 BUILDING DESIGN.

The planning and budgeting process must include the following design considerations. Emphasis is placed on the design of functional and pleasant food service facilities that help attract and retain patrons. The building design must comply with Command and Installation architectural standards. The dining facility can represent a visual focal point on base, similar to a headquarters building, and its design can set the standard for the Installation.

2-7.1 Design for Flexibility.

Planners and designers should recognize that future renovations, additions and expansions of the facility are likely.

2-7.2 Aesthetics and Visual Image.

The dining experience represents a break in the patron's day. Its design should provide a visual respite as well. The designer should provide an aesthetic and visual image in keeping with the recreational functions of the facility.

2-7.2.1 Develop Architectural Character.

Create an appealing environment through interesting plan areas, spatial volumes, and other design elements. If outdoor dining is provided, consider the effect on both the facility layout and design character.

2-7.2.2 Signage.

Develop a comprehensive signage package (both exterior and interior) that addresses both way-finding and definition of all spaces within the facility. This may include signage which identifies serving stations. Signage should reflect and complement the environment through colors, images and materials used.

2-7.2.3 Menus.

The main menu board is a focal point of the entry. Individual serving lines and stations will have their own menu, and the design and location of the menu board will depend on the serving methodology.

Design the entrance areas for flexibility to allow a variety of menu designs in terms of accessibility, space, power, and lighting.

2-7.3 Glazing.

The admission of natural light contributes significantly to the energy efficiency of the building and communicates a feeling of well-being and openness. Coordinate glazing design with the lighting design.

Direct sunshine on dining patrons can be uncomfortable and distracts from a positive dining experience. Provide shading devices, window treatments, tinted glass or landscaping to minimize direct sunlight on the glazing and glare in the dining area.

Use methods to prevent direct sunlight on the seating, serving and food preparation areas if skylights are provided.

2-7.4 Design for Quality Work Environment.

Ensure quality building systems, adequate employee facilities, easily accessible safety devices, and prevention of entry by vermin and insects.

2-7.5 Design for Durability and Maintainability.

The materials proven to be the most durable are shown in Table 3-1 and should be accommodated in the budget. The design should accommodate access for cleaning and maintenance in high-wear areas, including food preparation, dishwashing, and pot- and pan-washing areas.

FC 4-722-01N
1 December 2013

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CHAPTER 3 DESIGN CRITERIA

3-1 GENERAL.

Comply with UFC 1-200-01, *General Building Requirements*, that provides applicability of model building codes and government-unique criteria for typical design disciplines and building systems, as well as for accessibility, antiterrorism, security, high performance and sustainability requirements, and safety. Use this FC in addition to UFC 1-200-01 and the UFCs and government criteria referenced therein.

3-1.1 Authorized Building Program.

A DD1391 funding document is developed for all new construction projects which establishes the project requirements and authorized building size. The designer can use the functional diagrams contained herein to create the logical flow and individual space allocations for approved functions within the facility, however the design may not exceed the square footage allowances of the DD1391 or add functional areas to the facility if the functions are not authorized in the validated DD1391.

3-1.2 Accessibility.

Refer to UFC 1-200-01 and comply with stated and cross referenced requirements for accessibility.

3-2 SUSTAINABILITY.

Navy requirements for Sustainability apply to construction, redesign renovation and modernization projects. Refer to UFC 1-200-02, *High Performance and Sustainable Building Requirements*. The Chief Engineer of NAVFAC has waived Green Building Registration and Certification requirements for projects designated austere (CONUS and OCONUS). However, requirements for the "Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (HPSB) remain. Use UFC 1-200-02 for criteria associated with HPSB.

3-3 FOOD CODE.

Design facilities to meet U.S. Department of Health and Human Services, Public Health Service, Food and Drug Administration, *Food Code*, latest edition.

3-4 STRUCTURE.

Refer to UFC 1-200-01 and comply with stated and cross referenced requirements for structural design. In addition, comply with the following:

- Provide clear spans as required for the dining area.
- If the facility has been designated as a Mass Care feeding facility (See Chapter 2, the paragraph entitled, "Mass Care Feeding Facility") then the

building is classified as Risk Category IV per UFC 3-301-01, *Structural Engineering*.

3-5 ARCHITECTURE AND INTERIOR DESIGN.

3-5.1 General.

Refer to UFC 1-200-01 and comply with stated and cross referenced requirements for Architecture and Interior Design.

3-5.2 Coordination.

The following Items require coordination with the architectural design:

- Requirements for floor drains, wall recesses, stub walls, and any pads or piers needed for food service equipment,
- All bumpers, guards, and protective devices,
- The use of special materials such as quarry tile, noncorrosive ceiling grid, skim coat plaster on Concrete Masonry Unit (CMU) walls, metal acoustic ceilings, plaster ceilings, and smooth face lay-in tile,
- All roof, ceiling, floor, and wall penetrations for ducts, control lines, refrigerant tubing, etc.,
- Floor elevation and slope requirements to ensure proper drainage of water in wet areas, and
- Doors from the loading dock into kitchen must be at least 8 ft. (2.4 m) tall and of adequate width in order to accommodate equipment.

3-5.3 Materials and Finishes.

Approved finishes for functional areas are located in Table 3-1. For deviation requests see Chapter 1 paragraph titled, "Distribution of Responsibilities". Floors that are slip resistant, drain well, and clean easily are of paramount importance. Floors must be able to endure cleaning by high-pressure spray equipment. All finishes must be coordinated with the interior designer.

Also comply with the following:

- Provide protective guards in all areas subject to cart traffic, i.e., walls, doors, and corners. Locate equipment to minimize cart damage.
- Door systems between kitchen/dishwashing areas and dining area must be sound resistive. Where feasible, design doors for wheeled traffic without raised thresholds. Doors should have windows to permit views of someone entering or exiting.
- All joints and intersections of materials must be sealed, free of pocketed or porous materials, and accessible for cleaning.

Table 3-1 Interior Finishes

Space	Finishes				
	Floor	Base	Walls	Protect	Ceiling
Entry/Vestibule	PT, RM	PT	Note 1		Note 3
Queue	PT or RF	PT or Rubber	Note 1		Note 3
Public Toilets	PT	PT	CT		MR ACT
Check-in	PT or RF	PT or Rubber	Note 1		Note 3
Dining Area	Carpet*, PT	Rubber or PT	Note 1	Note 2	Note 3
Serving, Patron Side	QT or PT	QT or PT	CT or GSU	Wall, Corners	MR ACT
Serving, Server Side	QT or EF	QT or EF	CT or GSU	Wall, Corners	MR ACT
Dishwashing	QT or EF	QT or EF	CT or GSU	Wall, Corners	MR ACT
Food Preparation Area	QT or EF	QT or EF	CT or GSU	Wall, Corners	MR ACT
Utensil Wash	QT or EF	QT or EF	CT or GSU	Wall, Corners	MR ACT
Storage, Freezer	QT or EF		MIP		MIP
Storage, Chilled	QT or EF		MIP		MIP
Storage, Dry	Sealed Concrete	Rubber	GWC on CMU	Corners	ACT
Storage, Non Food	Sealed Concrete	Rubber	GWC on CMU	Corners	Exposed or ACT
Storage, Carb. Beverage	QT or EF	QT or EF	GWC on CMU		ACT
Offices	Carpet, PT or RF	Rubber or PT	Painted CMU		ACT
Staff Toilets	PT	PT	GWC on CMU		MR ACT
Staff Lockers	QT or PT	QT or PT	GWC on CMU		MR ACT
Janitor Closet	SC, PT or QT	Rubber, PT or QT	GWC on CMU	Corners	Exposed
Can Wash	Acid Resist EF	EF	Epoxy or CT	Wall, Corners	MR ACT
Loading Dock	SC		Exterior		Exterior
Mechanical	SC		Painted CMU		Exposed

Note 1: Walls in public areas may be a variety of durable materials such as brick, split block, exposed concrete, plaster, or other materials as approved.

Note 2: Provide wall guard protection at locations subject to cart traffic.

Note 3: Ceilings in public areas may be a variety of suspended acoustic ceiling materials to add visual interest.

General Note: All grout must be epoxy. Consider use of darker grout to hide soiling.

Abbreviations: ACT—acoustic ceiling tile CMU—concrete masonry unit CT—ceramic tile
 GSU—glazed structural unit GWC—glazed wall coating MIP—metal insulated panel
 QT—quarry tile SC—sealed concrete MR—moisture resistant
 PT—porcelain tile RM—recessed walk-off mat RF—resilient flooring
 EF—epoxy flooring

*If carpet is introduced, limit to dry areas and use carpet tile

3-6 SERVICES.**3-6.1 Plumbing.**

Refer to UFC 1-200-01 and comply with stated and cross referenced requirements for plumbing. In addition, design domestic hot and cold water, sanitary and storm drainage, propane, fuel oil, or natural gas systems to meet the requirements of local Installation standards and the following requirements:

3-6.1.1 Plumbing Systems.

Give special consideration to the following requirements:

- Provide freeze proof wall hydrants at exterior wash areas in addition to other locations around the building.

3-6.1.2 Waste Systems.

Comply with the following requirements:

- Grease traps are typically located outside the building near the loading dock but outside of vehicle pathways and must be easily accessible for cleaning. Exposed covers must be rust-proof and skid resistant.
- If grease interceptors are used in lieu of central grease traps to service individual equipment, they must be easily accessible for cleaning, be located outside of food preparation areas, and not project above the floor in open walkways or work areas. Exposed covers must be rust-proof and skid resistant.
- Base environmental office or waste management program will determine the type of waste permitted from food grinders, waste pulping system and floor drains.
- Apply an air gap of two pipe diameters to all kitchen equipment drains not having other backflow protection. Navy projects also use Cross-Connection Control and Backflow Prevention Program Implementation.
- Coordinate floor sinks of adequate size and non-splash receptor design with drained equipment requirements. Prime floor drains are not used as indirect waste receptors or provided with deep seal traps.
- Do not locate waste piping above kitchen and storage areas.
- Visually-exposed equipment waste and drain lines must be chrome plated or be chrome sleeve copper pipe and fittings.
- Coordinate drain requirements for HVAC, cold storage refrigeration equipment, and the can wash.

3-6.1.3 Water Supply Systems.

Comply with the following domestic water requirements:

- Coordinate specialized food service equipment needs for hard/soft water and pressure.
- In general, provide a filtration system on the building main water line. However, if building water is not filtered as part of a central system, provide a kitchen based central water filter with filters for .5 micron particulates and taste. Split discharge for two circuits: The first circuit connects to soda and cold beverage machines and the second circuit must include a polyphosphate additive before connecting to coffee brewers, equipment with boilers, and ice makers.
- Provide high-temperature water supply in accordance with UFC 3-420-01, *Plumbing Systems*, for the dishwasher, pot and pan wash, can wash, and field feeding area (if provided).
- Diversity factors for water heating based on food service equipment usage. Dining facilities may require two or more different hot water temperatures zones. Public and employee handwashing sinks require either temperature-limiting devices or different incoming hot water temperature than food equipment.
- Hot water storage and recirculation. Note: where limited flow fixtures are required, piping and recirculation system adjustments may be required to ensure hot water at fixture. Design piping system such that no fixture requires longer than 15 seconds to receive full temperature hot water.
- Backflow protection is required on all equipment and appliances with water connections, including connections to beverage machines that may include internal backflow prevention, in accordance with the references provided in this FC.

3-6.1.4 Additional Plumbing Criteria.

Comply with the following plumbing design requirements:

- Food service designer determines the locations and specifications for all food service equipment (fixed and relocatable). Food service equipment layout and specifications must be coordinated with the facility mechanical designer for coordination of facility plumbing design.
- The locations of all water, waste, steam and steam condensate, refrigeration condensate, chilled water supply and return, floor drains, and gas lines must be coordinated with equipment requirements. These lines must be concealed but readily accessible for maintenance. Provide washable covers where the lines are exposed.
- Unavoidable exposed vents for island or freestanding equipment must be coordinated with the architect for design of vent enclosure.
- All special or custom-made water-, gas-, and steam-consuming equipment must be installed by a manufacturer's acceptable technician. Design and location of required grease traps will require coordination among the mechanical, plumbing, architectural, and, possibly, the structural designers.
- If under-floor conduits are used for routing of the beverage system, ensure that they are sealed conduits with cleanouts and pull boxes every 100 ft. (30.5 m), installed with pull lines and sealed upon product line installation.
- Provide floor drains and hose bibb in beverage storage area.
- Provide plumbing and allocated hot water capacity to the automatic wash-down system with battery back-up wash timer for exhaust hoods, if appropriate.
- Coordinate any special requirements for plumbing connections to utility distribution systems.
- For connections to gas-fired equipment, flexible connections must be 300-series braided stainless steel, fittings must be brass or stainless steel, hose coverings must be NSF-approved coatings and fitted with required restraints.

3-6.2 Heating, Ventilating, and Air Conditioning (HVAC).

Design the HVAC system to meet the requirements of the most current edition of the International Mechanical Code (IMC). In addition comply with the requirements of UFC 3-401-01, *Mechanical Engineering* and UFC 3-410-01, *Heating, Ventilation, and Air Conditioning Systems*.

Also comply with following in the design of the mechanical system:

- National Fire Protection Association (NFPA) 96, *Ventilation Control & Fire Protection of Commercial Cooking Operation*.

- Underwriters Laboratories (UL) 710, *Exhaust Hoods for Commercial Cooking Equipment*.

Additional HVAC requirements unique to Dining Facilities include the following:

- Provide variable speed kitchen hood fans in accordance with ASHRAE 90.1, 2010 edition
- Design HVAC system to allow for control of the following:
 - large daily load swings
 - high space latent loads
 - high and variable ventilation requirements

3-6.1.5 Coordination.

The following items require coordination with the HVAC design:

- Location and size of all ventilated equipment such as exhaust hoods, dishwashing equipment, etc.
- Special requirements for ductwork connecting to equipment such as drip pans and pitched or vented duct work.
- Ventilation of remote refrigeration condensers.
- Balance of air supply systems so cooking and waste areas are under negative pressure, ensuring that odors are not carried into public areas.

3-6.1.6 Heat Recovery Equipment.

Economic analysis of heat recovery equipment, particularly from ventilation, cold storage, and central HVAC refrigeration, must be per the "Life Cycle" guidelines in NAVFAC P-442, *Economic Analysis Handbook*.

3-6.1.7 Controls.

Specify direct digital control (DDC) system per UFGS 23 09 23.13 20, *BACnet Direct Digital Control Systems for HVAC* or UFGS 23 09 23, *Lonworks Direct Digital Control for HVAC and Other Building Control Systems*. Coordinate DDC specification to ensure proper interface to existing or planned base-wide DDC/EMCS system.

3-6.3 Fire Protection and Life Safety.

Refer to UFC 1-200-01, General Building Requirements and comply with stated and cross referenced requirements for fire protection and life safety requirements.

3-6.4 Electrical Design.

In addition to the criteria established in UFC 1-200-01 and the references therein, comply with the following dining facility-specific requirements:

3-6.4.1 Emergency Power.

When the facility is designated as a Mass Care feeding facility, provide a permanent, external self-contained emergency generator that powers the entire facility load. Provide 72 hours of fuel storage. See Chapter 2 paragraph titled, "Mass Care Feeding Facility", for more information.

When the facility is not designated as a Mass Care feeding facility, provide service entrance with external temporary emergency generator hook-up for the facility. At a minimum, loads to be supported by the emergency generator include the following: 100% cold storage and facility lighting. If required by activity, support additional loads as determined on a case-by-case basis. Ensure availability of a hard surface area adjacent to the building service entrance to accommodate the generator. Provide signage at the external generator connection indicating the minimum load requirement for the portable generator (kVA, Voltage, Ampere).

3-6.4.2 Electronic Security System (ESS).

Design the ESS in accordance with UFC 4-021-02, *Electronic Security Systems*.

3-6.4.2.1 CCTV.

Provide the infrastructure for a CCTV system. The contacts provided in Chapter 1 paragraph titled, "Distribution of Responsibilities", will determine if design and construction funds will be provided for a complete and usable CCTV system.

3-6.4.3 Coordination.

The following items require coordination with the electrical design:

- Cashier stations for both data and telephone outlets.
- All projected power requirements for food service equipment (coordinated with the food service designer as early as possible). In addition to the power characteristics, the type of electrical connection required (plug-in, junction box), and other special requirements for each piece of equipment must be determined.
- Integration of food service equipment with fire suppression system controls.

- Electrical service requirements for all equipment must be as specified in the Unified Facilities Guide Specifications (UFGS) listed in Chapter 3 paragraph titled, "Equipment".
- Floor-mounted flush receptacles are not permitted in the kitchen area or serving line.

3-7 EQUIPMENT.

Provide the type, quantity and size of equipment necessary and with sufficient redundancy and/or multi-function features to develop meals based on the following requirements:

- The facility's 21-day menu;
- The facility's staffing plan;
- The facility's hours of operation, meal schedule and duration;
- Normal maintenance requirements;
- The standards of quality required in the latest editions of UFGS 11 41 11, Refrigerated and Frozen Food Storage Equipment; UFGS 11 42 00, Food Preparation Equipment; UFGS 11 44 00, Food Cooking Equipment; UFGS 11 46 00, Food Dispensing Equipment; UFGS 11 47 00, Ice Machines; and UFGS 11 48 00, Cleaning and Disposal Equipment.
- All other code requirements in this FC.

3-7.1 Walk-In Refrigeration/Freezer.

To retain refrigerated air and reduce insect infestations per NAVMED P-5010-1, provide vinyl slatted curtains hanging inside the doors or provide a blower type air curtain outside the doors of walk-in refrigerators and freezers.

Provide a heated view port window in the door of walk-in refrigerators and freezers to permit views of anyone entering or exiting, and provide a safety handle on the interior of the door.

3-7.2 Cashier's Safe.

Provide a three-tumbler safe containing individual combination-locked compartments for each cashier plus one cash collection agent.

3-8 SITE WORK.

Refer to UFC 1-200-01 and comply with stated and cross referenced requirements for site work.

3-8.1 Landscape.

Comply with UFC 3-201-02, *Landscape Architecture* and the local Installation landscape standards. Landscape must accentuate the building's main entrance. Provide landscaping at the outside dining area when one is provided to include but not limited to: specialty paving (i.e. - precast concrete pavers, brick pavers), shade trees, foundation planting, and screen planting as required. All landscaping must be designed with an emphasis on low-maintenance (reduced pruning, fertilization, pest control, leaf, flower, and fruit clean-up), drought tolerance, and native plant selection.

3-8.2 Parking, Access Drives, and Other Site Features.

Provide separate access drives for parking and loading dock access. Use turning radii for loading dock access roads appropriately sized for delivery trucks. For facilities serving up to 400 personnel use minimum 6 feet (1.8 m) wide sidewalks; facilities serving more than 400 personnel must use minimum 8 feet (2.4 m) wide sidewalks.

When a facility is designated as a Mass Care feeding facility, locate parking areas and other critical use areas out of the 100-year flood plain.

APPENDIX A REFERENCES

ASHRAE

<https://www.ashrae.org/home/>

ASHRAE 90.1, 2010 Edition, *Energy Standard for Buildings Except Low-Rise Residential Buildings*

DEPARTMENT OF HEALTH AND HUMAN SERVICES

<http://www.fda.gov/>

Food Code, Food and Drug Administration

DEPARTMENT OF DEFENSE, UNIFIED FACILITIES CRITERIA PROGRAM

<http://dod.wbdg.org/>

UFC 1-200-01, *General Building Requirements*

UFC 1-200-02, *High Performance and Sustainable Building Requirements*

UFC 2-000-05N (P-80), *Facility Planning Criteria for Navy and Marine Corps Shore Installations*

UFC 3-201-02, *Landscape Architecture*

UFC 3-301-01, *Structural Engineering*

UFC 3-310-01, *Structural Load Data*

UFC 3-401-01, *Mechanical Engineering*

UFC 3-410-01, *Heating, Ventilation and Air Conditioning Systems*

UFC 3-420-01, *Plumbing Systems*

UFC 4-021-02, *Electronic Security Systems*

UFGS 11 41 11, *Refrigerated and Frozen Food Storage Equipment*

UFGS 11 42 00, *Food Preparation Equipment*

UFGS 11 44 00, *Food Cooking Equipment*

UFGS 11 46 00, *Food Dispensing Equipment*

UFGS 11 47 00, *Ice Machines*

UFGS 11 48 00, *Cleaning and Disposal Equipment*

UFGS 23 09 23.13 20, *BACnet Direct Digital Control Systems for HVAC*

UFGS 23 09 23, *Lonworks Digital Control for HVAC and Other Building Control Systems*

DEPARTMENT OF THE NAVY

P-442, *Economic Analysis Handbook*, August 1993, Naval Facilities Engineering Command (NAVFAC), http://www.wbdg.org/ccb/browse_cat.php?c=91

NAVMED P-5010-1, *Food Safety*, Navy Bureau of Medicine and Surgery, <http://www.med.navy.mil/directives/Pages/Publications.aspx>

FOODSERVICE CONSULTANTS SOCIETY INTERNATIONAL (FCSI)

<http://www.fcsi.org/>

FCSI Membership Directory

INTERNATIONAL CODE COUNCIL

<http://www.iccsafe.org>

International Mechanical Code (IMC)

NATIONAL FIRE PROTECTION ASSOCIATION

www.nfpa.org

NFPA 96, *Standard for the Installation of Equipment for the Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment*

UNDERWRITER'S LABORATORY

www.ul.com

UL 710, *Exhaust Hoods for Commercial Cooking Equipment*

APPENDIX B BEST PRACTICES

B-1 INTRODUCTION.

The following material identifies current good design practices for each functional area as outlined in the space program. The designer is expected to interpret this guidance and configure the functional areas according to the needs of the project.

B-2 GENERAL BUILDING DESIGN.

B-2.1 Acoustics.

All facilities should be designed or treated to provide a comfortable acoustical environment.

B-2.1.1 Finishes.

In key areas, use finishes that absorb sound, reduce noise reflection, and minimize the generation and impact of noise. These finish materials have a high Noise Reduction Coefficient (NRC) rating.

- Ceilings in the dining area should have a minimum 0.6 NRC rating. Ceilings in the kitchen should have a minimum 0.6 NRC rating, be washable, and be United States Department of Agriculture (USDA) listed for this application.
- Acoustic wall treatments in the dining area should be implemented above wainscot height, located away from high traffic areas, and have a minimum 0.8 NRC rating. If located near high-traffic areas, incorporate an abuse-resistant finish.
- Floor finishes in the dining area should be selected to minimize noise generation.

B-2.1.2 Partitions.

The partitions separating noisy areas (such as the kitchen, dishwashing, and pot and pan wash) from sound-sensitive areas (such as the dining area and offices) should have a partition assembly with a minimum 50 sound transmission coefficient (STC) laboratory rating.

Openings between the kitchen and the dining area should incorporate baffles or screens, where possible, to minimize a direct noise path between these spaces.

B-3 QUEUE.

Dining facilities that accommodate large training commands or functions will experience surge conditions and require a larger queue than comparable facilities that do not. When the queue is adjacent to the dining area, use a screen to separate queued patrons from the dining area.

B-4 DINING AREA.

The dining area provides one of the principal facility functions. Issues of particular importance are as follows:

- **Space Division.** Dining areas should be capable of being subdivided by plan or partition to close off portions during off-peak serving periods.
- **Visual Separation.** Visually separate the eating area from all other facility functions.
- **Seating.** Provide a variety of table sizes and seating options. Use nonfixed and easily cleanable furnishings.

B-5 SERVERY.

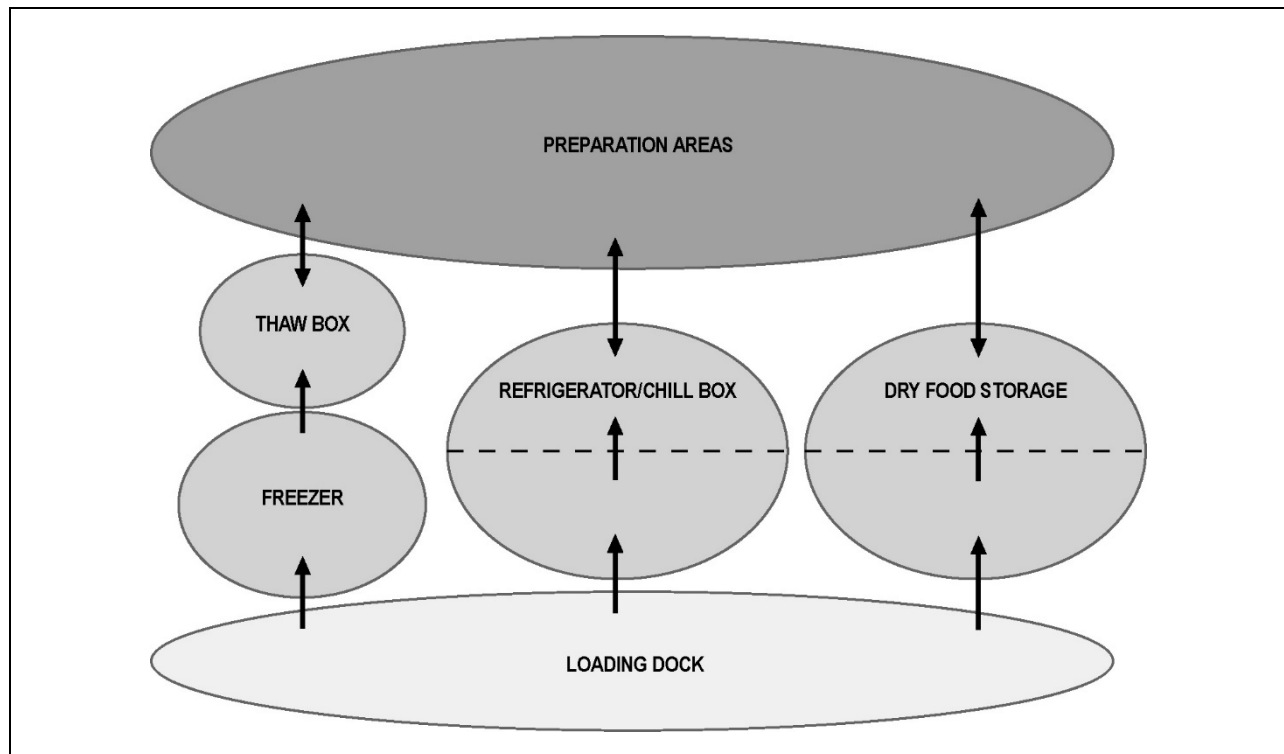
Design the lines and stations for flexibility and good traffic flow. Beverage station locations should accommodate patron refills without disrupting the serving line flow. Locate beverage and CO₂ tanks remotely. Secure CO₂ tanks with safety straps or in a cage designed for the application. Consider providing space at the loading dock area for refilling and bulk storage of CO₂ tanks.

B-6 FOOD SERVICE AREAS.

Food service areas include receiving, storage, preparation, and cleaning areas.

- **Loading Dock.** Include a can wash area with high temperature water supply and drain connected to the sanitary line. Confirm loading platform heights with the majority of trucks servicing the facility. Dock levelers may be provided to accommodate varying truck platform heights. Provide a non-skid dock surface and bumpers at the dock to prevent impact damage. In locations with extreme weather conditions, the loading dock may need to be enclosed. Provide a ramp to connect the loading dock with the vehicular area to facilitate the use of hand trucks/carts and provide cart stops and the edge of the dock to prevent rolloff. Provide a canopy that extends 48 in. (1,220 mm) beyond the edge of the platform. Confirm canopy heights with the majority of trucks servicing the facility, and confirm door widths with common delivery item sizes.
- **Refrigerator/Freezer.** The floor under the box should be depressed and insulated so its' finished height is level with the surrounding kitchen floor. Provide separate exterior exits from both the freezer and the refrigerator/chill box to the loading dock. The interior exit from the freezer to the food preparation area must be through a thaw box via a door that is lockable on the freezer side. The refrigerator/chill box must be divided by a wire mesh partition between the exterior exit to the loading dock and the interior exit to the food preparation. This partition must have a door that is lockable on the loading-dock side. See Figure B-1. Provide safety handles.

- **Dry food storage.** The exterior access from the dry food storage must exit directly to the loading dock and the interior access must exit directly to the food preparation area. The dry food storage must be divided by a wire mesh partition between the exterior exit and the interior exit. This partition must have a door that is lockable on the loading-dock side. See Figure B-1.
- **Nonfood Storage.** Separate cleaning product storage from food product storage.
- **Kitchen.** Provide individual or continuous floor grates with drains to facilitate cleaning and catch discharge from cooking equipment such as steam kettles and tilting frying pans. Provide sufficient separation between steam-generating cooking equipment and other open-type cooking equipment.
- **Vegetable Preparation Area.** In some facilities, this area may be a separate, refrigerated room with its own dedicated walk-in refrigerator, sinks, slicers, choppers, mixers, worktables, and other equipment.
- **Bakery.** Some facilities may include a bakery.
- **Flight Kitchen.** Flight kitchens should have direct exterior access.
- **Field Feeding/Vat Chow.** Provide adequate power and amenities for food preparation. Provide direct access to the loading dock.
- **Takeout/Meal Replacement.** Provide adequate power and amenities for food preparation and packaging/storage. This area may have a separate entrance/exit and its own point-of-sale station.
- **Dishwashing Area.** The dishwashing area should be located as close to the dining area exit as possible to permit self-bussing by the patron. A tray conveyor bussing system or a cart bussing system may be incorporated into the design.
- **Utensil/Pot and Pan Wash.** Ensure adequate moisture control and ventilation.
- **Pulper/Extractor System.** Provide a pulper/extractor system adjacent to the dishwashing areas to reduce manpower and water consumption. Consider providing a piped connection to the trash areas to improve sanitation in the dishroom and, depending on siting layout, it could eject directly into the trash dumpster, further reducing manpower.

Figure B-1 Storage Access Diagram**B-7 FOOD SERVICE EQUIPMENT.**

All design work relating to kitchen equipment must be separately presented for review and must include all information required for fabrication and installation of all kitchen equipment.

B-7.1 Sample Equipment Schedules.

The following is the Navy and Marine Corps conceptual equipment list. This is a partial list. Any equipment not listed here that is required to provide a complete working system for the stated demand must be provided per Chapter 3 paragraph titled, "Equipment".

Table B-1 Navy Conceptual Equipment List

<ul style="list-style-type: none"> • Air curtain • Air pot brewer • Air pots • Anti-splash floor troughs • Area floor drain • Bagel display • Bagel toaster • Bain marie • Bar code scanner • Benches • Blast chiller • Braising pan, 40 gallon (150 L) • Bread display • Bussing cart • Can opener • Can rack • Cappuccino dispenser • Carbonator • Cash register • Cashier counter • Cashier scales • Charbroiler • Chemical storage shelving • Clean dish table • Coffee brewer • Coffee dispenser • Cold food wells • Combination oven/steamer • Computers • Condensers for walk-ins • Condensers for ice makers • Condiment counter • Condensate exhaust canopy • Cone dispenser • Convection steamer, 10 pan • Conveyor bagel toaster • Cook & hold cabinet • Counter with freezer base • Counter with sink • Cup dispensers • Declining balance card dispenser • Dish carriers • Dishwasher • Dishwasher vents • Disposer with pre-rinse faucet • Double deck convection oven • Dry storage shelving • Dunnage rack • Electric can opener • Electronic programmable station signage • Electronic sandwich pre-ordering station 	<ul style="list-style-type: none"> • Knife rack • Maximicer heat recovery • Menu dupe printers • Microwave oven • Mixer, 20 qt. (19 L) • Mixer, 60 qt. (57 L) • Mixer, 80 qt. (76 L) • Mobile attachment shelving • Mobile chemical shelving • Mobile hot food cabinet • Mobile hot food cabinet/proofer • Mobile mixer table • Mobile pot/pan shelving • Mobile range • Mobile slicer table • Mobile tray rack • Mobile utensil soak sink • Mop rack • Office printers • Open front refrigerated display cabinet • Panini grill • Pastry case • Pizza oven • Pizza make-up refrigerator • Pizza preparation table • Plate dispenser • Platform truck • Pot/pan utensil rack • Pre-rinse faucet • Pulper/extractor • Rack dolly • Receiving scales • Recirculating disposer • Recycling containers • Refrigerated cold pan • Refrigerated cream dispenser • Refrigerated equipment stand • Refrigerated equipment stand with cold rail • Reach-in refrigerator • Remote rack refrigeration system • Roll-in refrigerator • Safe • Scale • Scanners • Serving counters • Silver sorting table • Sink heater • Slicer • Snack cabinet • Soiled dish table • Soup wells
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Table B-1 Navy Conceptual Equipment List

<ul style="list-style-type: none"> • Espresso machine • Evaporators for walk-ins • Exhaust hoods, Type 1 • Exhaust hoods, Type 2 • Fire suppression system • Floor troughs • Food guards • Food processor • Food cutter • Frost top • Frozen novelty freezer • Fryer battery with filter • Griddle • Hand sink • Handicapped kitchen work table • Heat lamps • Heated display cabinet • Heated shelf • Hose bibb • Hose reel • Hot chocolate dispenser • Hot food wells • Hot/cold pan • Ice bin • Ice maker for soda dispensers • Ice machine • Ice/soda dispenser • Iced tea dispenser • Ingredient bins • Insect control equipment • Janitor sink w/ can wash • Kitchen lockers 	<ul style="list-style-type: none"> • Spent oil cooler • Stainless steel wall panel • Steam kettles • Storage cabinet • Strip curtain • Table top oven • Time clock • Toppings dispenser • Tray accumulator, five tier • Tray cabinet • Tray carriers • Tray return opening frame • Turbo-wash, three-compartment sink • Twin soft serve dispenser • Twin 12 gallon (45 L) kettles with stand • Two-compartment sink • Under-counter refrigerator • Uniform hot top range • Utensil rack • Utility cart • Vegetable dryer • Vertical cutter/mixer • Walk-in cooler shelving • Walk-in dunnage rack • Walk-in cook's cooler • Walk-in meat/dairy cooler • Walk-in freezer • Walk-in produce cooler • Wall shelf • Water filter • Water temperature booster 180 F (82 C) • Work table • Work table with sink
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B-7.2 Vibration.

Mount vibration-producing equipment on vibration isolators. Provide vibration-resistant pipe mounting and joints for equipment requiring plumbing.

B-7.3 Utilities.

Coordinate utilities with equipment selection. In general steam-powered equipment is less expensive and easier to maintain than gas-powered equipment. To the degree possible, equipment should be standardized across an Installation or Region to facilitate maintenance and maintenance training.

B-8 STAFF FACILITIES.**B-8.1 Staff Toilets.**

Both Government and contract personnel use staff toilets. Designer must consult with the local command to determine staffing figures and shift population.

B-8.2 Staff Lockers.

Provide separate facilities for male and female personnel. Locate locker facilities adjacent to the toilets. Equip locker rooms with showers, lockers, benches, and coat hooks to facilitate the changing of clothes. Locker quantities must be as indicated in Table B-2. All lockers should be half height except for facilities for 1,001 patrons and over, where three-tier lockers must be used. The number of lockers scheduled for each space exceeds the projected number of workers for each category. This is to accommodate the likely shifting balance of male to female workers. If equipment costs prohibit this number of lockers, provide space for the number of lockers in Table B-2. In this case, a portion of the lockers should be freestanding so that they can be shifted from space to space as the staffing balance changes. All lockers must have sloped tops.

Table B-2 Staff Locker Count

No. of Staff	Military		Contract	
	Male	Female	Male	Female
40 to 80	(combined facilities, 10 male, 6 female)			
81 to 150	(combined facilities, 16 male, 10 female)			
151 to 250	18	6	6	12
251 to 400	24	8	12	24
401 to 650	30	10	30	48
651 to 1000	48	12	44	70
1001 to 1500	64	16	64	96
1501 to 2200	96	24	88	132

B-9 PLUMBING DESIGN.**B-9.1 Sanitary Waste Piping.**

Do not use cast iron piping for sanitary lines in dining facilities due to their susceptibility to deterioration.

B-10 HVAC DESIGN.

Where possible, use remote condensers to reduce internal heating loads (i.e., ice machines, built-in refrigerators and freezers).

FC 4-722-01N
1 December 2013

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APPENDIX C AUSTERE DINING FACILITIES**C-1 PURPOSE.**

The purpose of this appendix is to provide implementation requirements for the austere construction established by Commander, Navy Installations Command (CNIC). These requirements were developed to address construction of support facilities in CNIC designated operating environments.

C-2 DEFINITION AND SCOPE.

An austere facility is defined as a structure designed and constructed with minimal infrastructure, footprint area and finishes, incorporating applicable building codes and facility criteria to assure adherence to all health, accessibility and life safety standards and regulations required to fulfill the mission, including Anti-Terrorism Force Protection appropriate to each site. Austere facilities should be built with the least total ownership costs (TOC) possible, including purchase, maintenance and use of consistently available alternative local goods.

C-3 APPLICABILITY.

This appendix applies to Navy dining facilities that are designated as austere by CNIC. This appendix modifies requirements which are provided in the main body of the specific Unified Facility Criteria (UFC and FC) guidance. Austere construction is intended for facilities in locations determined by CNIC and approved by OPNAV to be eligible for austere facilities construction. The austere standards are intended to be applied flexibly and in varying degrees to all facilities at locations designated as austere. The flexibility should be allowed to ensure the criteria are appropriate for individual austere locations.

C-4 MODIFICATIONS.

The following are modifications to FC 4-722-01N, *Navy and Marine Corps Dining Facilities* when designated austere:

CHAPTER 2 PLANNING AND LAYOUT**2-1 FOOD SERVICE PLANNING DETERMINATIONS.****2-1.7 Bussing.**

Delete this paragraph from the FC and replace with the following:

Patron self-bussing will be the standard mode of bussing.

2-2.1 Entrance Lobby.

Add the following:

Canopies will not be used in austere facilities unless needed for weather conditions.

2-2.4 Cashier Station.

Delete this FC paragraph and replace it with the following:

The cashier station/sign-in station accommodates patron payment. The configuration, location and number of stations are determined by the number of personnel served, food delivery methodology, and the payment style. Payment options (credit, Smart™ cards) will be determined prior to design. No cash payments allowed.

2-2.11 Support Areas.

Delete the FC paragraph and add the following:

Support areas accommodate staff needs such as offices, training, other administrative tasks, toilets, lockers, and janitor closets. These areas are determined by the mission and staffing requirements. For austere facilities, provide a single administrative office that can accommodate up to three people.

2-3 SIZE OF FACILITIES.

2-3.1 Navy and Marine Corps.

Delete the FC paragraph and replace it with the following:

Determine the number of personnel to be served by multiplying the projected maximum unaccompanied housing occupancy by the utilization factors in Table C-1. Include the average on-board count of ships entitled to rations in-kind while shipboard facilities are out of service in the projected occupancy. Do not include personnel on separate rations in the projected occupancy.

Table C-1 Personnel to be Served by Mission

Mission	Utilization Factor
Austere Locations	90%

2-4 SPACE PROGRAMS.

2-4.1 Navy and Marine Corps.

Delete the FC paragraph. Refer to UFC 2-000-05N, *Facilities Planning Criteria for Navy/Marine Corps Shore Installations* for space planning spreadsheets for austere dining facilities.

2-4.1.1 Space Program Assumptions.

Modify the FC requirements as follows:

- Seating should be based on 12 ft.2 (1.1 m2) per seat.
- Bake shops are not allowed.

- Separate Meat and Vegetable Preparation areas will not be provided.

2-4.1.2 Storage.

Add the following to the FC paragraph:

Austere facilities are identified the same as OCONUS rural/remote facilities due to infrequent delivery periods.

2-7 BUILDING DESIGN.

Add the following to the FC paragraph:

For austere facility locations, the dining facility should not represent a visual focal point on base, nor will its design set the standard for the installation.

2-7.1 Design for Flexibility.

Delete the FC paragraph.

2-7.2 Aesthetics and Visual Image.

Delete the FC paragraph.

CHAPTER 3 DESIGN CRITERIA**3-2 SUSTAINABILITY.**

Delete the FC paragraph and use the following: The Chief Engineer of NAVFAC has waived LEED Registration and Certification requirements for projects designated austere (CONUS and OCONUS). However, requirements for the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (HPSB) remain. Refer to UFC 1-200-02 for criteria associated with HPSB.

3-3 COMMISSIONING.

Delete the FC paragraph and use the following: Navy requirements related to LEED Registration/Certification and High Performance and Sustainable Buildings are provided in UFC 1-200-02 and should be followed.

3.5.3 Materials and Finishes.

Delete Table 3-1 and use Table C-2.

Table C-2 Austere Architectural Finishes

General Space	Recommended Finishes			
	Floor	Base	Walls	Ceiling
Vestibule	CONCS/WM	RB	P	EXP/P, Note 1
Queue	CONCS	RB	P	EXP/P, Note 1
Public Toilets	CONCS	RB	P	EXP/P, Note 1
Check-in	CONCS	RB	P	EXP/P, Note 1
Dining Area	CONCS	RB	P	EXP/P, Note 1
Serving, Patron Side	QT or EF	QT or EF	P	EXP/P, Note 1
Serving, Server Side	QT or EF	QT or EF	P	EXP/P, Note 1
Dishwashing	QT or EF	QT or EF	P	P
Food Preparation Area	QT or EF	QT or EF	P	P
Utensil Wash	QT or EF	QT or EF	P	P
Storage, Freezer	QT or EF	QT or EF	P	P
Storage, Chilled	QT or EF	QT or EF	P	P
Storage, Dry	CONCS	RB	P	P
Storage, Non Food	CONCS	RB	P	P
Storage, Carb. Beverage	QT or EF	QT or EF	P	P
Offices	CONCS	RB	P	EXP/P, Note 1
Staff Toilets	CONCS	RB	P	EXP/P, Note 1
Staff Lockers	CONCS	RB	P	EXP/P, Note 1
Janitor Closet	CONCS	RB	P	EXP/P, Note 1
Can Wash	CONCS		P	EXP/P, Note 1
Loading Dock	CONCS		P	EXP
Mechanical	CONCS		P	EXP

Note 1: Ceilings are to be exposed and painted, including all exposed plumbing, mechanical, fire stops and electrical conduit, unless it is more cost effective to provide a hard finish, painted ceiling.

Note 2: Provide wall and corner guard protection at locations subject to cart traffic.

Key:

CONCS – Concrete, Hardened and Sealed (option: integrally colored for accent)

EXP – Exposed

P – Paint

QT – Quarry Tile

RB – Rubber Base

WM - Walk-off Mat (Surface)

EF – Epoxy Flooring

3-7 EQUIPMENT.**3-7.1 Walk-In Refrigeration/Freezer.**

Add the following:

Bulk storage for chilled/frozen/dry goods may be located exterior to building in appropriate environments.

3-7.2 Cashier's Safe.

Delete paragraph and replace with the following:

In austere environments, there will be no cash taken at facility and no safe is required.

3-8.1 Landscape.

Delete paragraph. No landscaping is required.

3-8.2 Parking, Access Drives, and Other Site Features.

Delete paragraph and replace with the following:

Apply austere decision making to assess, modify and incorporate requirements such as pedestrian circulation, bus access, service vehicle parking, and lighting plans appropriately to local conditions and to limit parking as much as possible while still meeting the facility mission. Review the security study and incorporate its requirements into the design. Ensure existing and proposed parking is in compliance with antiterrorism requirements. In austere facilities parking for residents, visitors, staff, and service personnel should be extremely minimal and only to the mission. Maintenance parking for service functions does not necessarily require dedicated space. Use the expected frequency of maintenance vehicles to determine whether dedicated parking is needed. Locate service access and parking to avoid disturbing residents.

APPENDIX B BEST PRACTICES**B-2 GENERAL BUILDING DESIGN.****B-2.1 Acoustics.**

Delete paragraph. No acoustic provisions are required.

B-7 FOOD SERVICE EQUIPMENT.**B-7.1 Sample Equipment Schedules.**

Delete Table B-1 and use Table C-3.

Table C-3 Navy Conceptual Equipment List for Austere Facilities

<ul style="list-style-type: none"> • Air curtain • Anti-splash floor troughs • Area floor drain • Braising pan, 40 gallon (150 L) • Bread display • Bussing cart • Can opener • Can rack • Carbonator • Cashier counter • Chemical storage shelving • Clean dish table • Cold food wells • Combination oven/steamer • Computers • Condensers for walk-ins • Condensers for ice makers • Condiment counter • Condensate exhaust canopy • Conveyor bagel toaster • Cook & hold cabinet • Counter with freezer base • Counter with sink • Cup dispensers • Declining balance card dispenser • Dish carriers • Dishwasher • Dishwasher vents • Disposer with pre-rinse faucet • Double deck convection oven • Dry storage shelving • Dunnage rack • Electric can opener • Evaporators for walk-ins • Exhaust hoods, Type 1 • Exhaust hoods, Type 2 • Fire suppression system • Griddle • Hand sink • Heat lamps • Heated shelf • Hose bibb • Hose reel • Hot food wells • Ice bin • Ice machine • Ice/soda dispenser • Janitor sink w/ can wash • Kitchen lockers 	<ul style="list-style-type: none"> • Knife rack • Microwave oven • Mixer, 20 qt. (19 L) • Mobile attachment shelving • Mobile chemical shelving • Mobile hot food cabinet • Mobile mixer table • Mobile pot/pan shelving • Mobile slicer table • Mobile tray rack • Mobile utensil soak sink • Mop rack • Office printers • Open front refrigerated display cabinet • Plate dispenser • Platform truck • Pot/pan utensil rack • Pre-rinse faucet • Rack dolly • Receiving scales • Refrigerated equipment stand with cold rail • Reach-in refrigerator • Remote rack refrigeration system • Scale • Scanners • Serving counters • Sink heater • Slicer • Soiled dish table • Stainless steel wall panel • Storage cabinet • Strip curtain • Tray accumulator, five tier • Tray cabinet • Tray carriers • Tray return opening frame • Twin soft serve dispenser • Two-compartment sink • Under-counter refrigerator • Utensil rack • Utility cart • Vertical cutter/mixer • Walk-in cooler shelving • Walk-in dunnage rack • Walk-in cook's cooler • Walk-in meat/dairy cooler • Walk-in freezer • Walk-in produce cooler • Wall shelf • Water temperature booster 180 F (82 C) • Work table with sink
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B-8 STAFF FACILITIES.

B-8.2 Staff Lockers.

Delete paragraph in the FC and replace with the following:

Lockers are for storage of personal items only. Male and female lockers need not be separate and may be combined with an appropriate area. Locate lockers close to the staff toilets. Locker quantities must be as indicated in Table B-2. All lockers should be half height except for facilities for 1,001 patrons and over, where three-tier lockers must be used. The number of lockers scheduled for each space exceeds the projected number of workers for each category. This is to accommodate the likely shifting balance of male to female workers. All lockers must have sloped tops.

FC 4-722-01N
1 December 2013

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APPENDIX D GLOSSARY**ACRONYMS**

ACT	Acoustic Ceiling Tile
AFCEC	Air Force Civil Engineer Center
AT	Antiterrorism
BEAP	Base Exterior Architectural Plan
BIA	Bilateral Infrastructure Agreement
BUMED	Bureau of Medicine and Surgery
C	Celsius
CCTV	Closed Circuit Television
CMU	Concrete Masonry Unit
CNIC	Commander, Navy Installations Command
CONUS	Continental United States
CT	Ceramic Tile
DDC	Direct Digital Controls
DoD	Department of Defense
EMCS	Energy Management Control System
F	Fahrenheit
FC	Facilities Criteria
FCSI	Foodservice Consultants Society International
Ft	Feet
GOJ	Government of Japan
GSF	Gross Square Feet
GSU	Glazed Structural Unit
GWC	Glazed Wall Coating
HPSB	High Performance and Sustainable Buildings
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HNFA	Host Nation Funded Construction Agreements
HVAC	Heating, Ventilation and Air Conditioning
IMC	International Mechanical Code
in	inch(es)
L	Liter
LEED	Leadership in Energy and Environmental Design
LFS	Logistics Food Service
m	Meter
min	Minimum

MIP	Metal Insulated Panel
mm	millimeter
MR	Moisture Resistant
NAVFAC	Naval Facilities Engineering Command
NFPA	National Fire Protection Association
NRC	Noise Reduction Coefficient
NSF	National Sanitation Foundation
OCONUS	Outside Continental United States
OPNAV	Chief of Naval Operations
PT	Porcelain Tile
Qt	Quart
QT	Quarry Tile
RF	Resilient Flooring
RIK	Ration-in-kind
RM	Recessed Walk-off Mat
SC	Sealed Concrete
SOFA	Status of Forces Agreements
sq m	Square Meter
Sq ft	Square Foot (Feet)
sq	Square
STC	Sound Transmission Coefficient
TOC	Total Ownership Costs
UFC	Unified Facilities Criteria
UFGS	Unified Facility Guide Specification
UL	Underwriters Laboratories
U.S.	United States
USDA	United States Department of Agriculture
USG	United States Government
USMC	United States Marine Corps