

\*\*\*\*\*  
USACE / NAVFAC / AFCESA UFGS-11400N (September 1999)

-----  
Preparing Activity: NAVFAC Replacing without revision  
NFGS of same number and date

## UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

\*\*\*\*\*

### SECTION TABLE OF CONTENTS

#### DIVISION 11 - EQUIPMENT

#### SECTION 11400N

#### FOOD SERVICE EQUIPMENT

09/99

#### PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 GENERAL REQUIREMENTS
  - 1.2.1 Mechanical General Requirements
  - 1.2.2 Electrical General Requirements
  - 1.2.3 Electromagnetic Interference Suppression
  - 1.2.4 Fungus Treatment of Electrical Components
- 1.3 DESCRIPTION OF WORK
- 1.4 SUBMITTALS
- 1.5 DRAWINGS
  - 1.5.1 Food Service Equipment Layout
  - 1.5.2 Utilities
  - 1.5.3 Custom Fabricated Equipment
- 1.6 DELIVERY, STORAGE, AND HANDLING

#### PART 2 PRODUCTS

- 2.1 MATERIALS
  - 2.1.1 Stainless Steel
    - 2.1.1.1 Sheets
    - 2.1.1.2 Tubing
    - 2.1.1.3 Bars
  - 2.1.2 Zinc-Coated Steel
    - 2.1.2.1 Sheets
    - 2.1.2.2 Shapes
  - 2.1.3 Brass Piping
    - 2.1.3.1 Pipe
    - 2.1.3.2 Fittings
  - 2.1.4 Copper Tubing
    - 2.1.4.1 Tube
    - 2.1.4.2 Fittings
  - 2.1.5 Lead-Free Solder
  - 2.1.6 Tin-Lead Solder
  - 2.1.7 Silver Solder
  - 2.1.8 Laminated Plastic

- 2.2 FABRICATION
  - 2.2.1 Welding
    - 2.2.1.1 Welds
    - 2.2.1.2 Joints
    - 2.2.1.3 Hidden Surface Welds
    - 2.2.1.4 Grinding, Polishing, and Finishing
    - 2.2.1.5 Protection Against Corrosion
  - 2.2.2 Soldering
    - 2.2.2.1 Soldering Stainless Steel
    - 2.2.2.2 Soldered Joints
  - 2.2.3 Brazing
  - 2.2.4 Chromium Plating
  - 2.2.5 Butt and Contact Joints, Bends, and Edges
  - 2.2.6 Bolts, Screws, and Rivets
  - 2.2.7 Legs
- 2.3 UTILITY REQUIREMENTS
  - 2.3.1 Electrical Requirements
  - 2.3.2 Plumbing Requirements
- 2.4 CUSTOM-FABRICATED COUNTERS, DISHWASHER COUNTERS, AND SINKS
  - 2.4.1 Counter Tops
  - 2.4.2 Counter Edges
    - 2.4.2.1 Work, Landing, and Dump Tables
    - 2.4.2.2 Cafeteria; Buffet; Hot and Cold Counters
    - 2.4.2.3 Side and Back Splashes
    - 2.4.2.4 Dish Tables, Vegetable, and Pot Sinks
  - 2.4.3 Counter Top Support
    - 2.4.3.1 Channels
    - 2.4.3.2 Angles
  - 2.4.4 Counter Bases
    - 2.4.4.1 Closed Counter Bases
    - 2.4.4.2 Open Counter Bases
  - 2.4.5 Legs
  - 2.4.6 Pedestal Bases
  - 2.4.7 Feet
  - 2.4.8 Casters
  - 2.4.9 Open Base Shelves
  - 2.4.10 Closed Base Interior Shelves
  - 2.4.11 Shelf Pan Slides
  - 2.4.12 Drawers
  - 2.4.13 Doors
  - 2.4.14 Tray Slide
    - 2.4.14.1 Solid Type
    - 2.4.14.2 Tube Type
    - 2.4.14.3 Brackets
  - 2.4.15 Protector Shelf
    - 2.4.15.1 Shelf Frame
    - 2.4.15.2 Shelf Frame Support
    - 2.4.15.3 Protector Glass
  - 2.4.16 Drip Gutter
  - 2.4.17 Sound-Deadening of Counters and Sinks
  - 2.4.18 Dishwasher Counters
    - 2.4.18.1 Drain Troughs
    - 2.4.18.2 Scrap Sink
    - 2.4.18.3 Disposer Cone
    - 2.4.18.4 Scrap Trough
    - 2.4.18.5 Sloped Cup/Glass Racking Shelf
    - 2.4.18.6 Undershelves
- 2.5 PASS-THROUGH WINDOWS
  - 2.5.1 Windows for Endless Belt Conveyors

- 2.5.2 Windows for Soiled Dish Counter
- 2.6 SINKS
  - 2.6.1 Sink Body
  - 2.6.2 Mounting
    - 2.6.2.1 Leg Mounting
    - 2.6.2.2 Wall Mounting
    - 2.6.2.3 Counter Mounting
  - 2.6.3 Sink Drain Valves
  - 2.6.4 Drains
  - 2.6.5 Faucets
  - 2.6.6 Hand Sink
  - 2.6.7 Pot-Washing Sink
    - 2.6.7.1 Third Compartment Water Booster Heater
  - 2.6.8 Vegetable Preparation Sink
- 2.7 GARBAGE DISPOSAL MACHINES
  - 2.7.1 Disposal Cone
  - 2.7.2 Motor
  - 2.7.3 Disposal Control Center
- 2.8 HOODS
  - 2.8.1 Centrifugal Grease-Extracting Hoods
    - 2.8.1.1 Types
    - 2.8.1.2 Features
    - 2.8.1.3 Automatic Washdown System
    - 2.8.1.4 Fan Control
    - 2.8.1.5 Fire Damper
    - 2.8.1.6 Fan Control Station and Plumbing Enclosure
    - 2.8.1.7 Fire Protection Systems
    - 2.8.1.8 Vapor proof Lights
  - 2.8.2 Condensate Hoods and Exhausts
    - 2.8.2.1 Hood Over Utensil-Washing Sink, Type 5
    - 2.8.2.2 Hood Over Utensil-Washing Machine, Type 6
    - 2.8.2.3 Exhaust Over Dishwashing Machines, Type 7
  - 2.8.3 Gutter and Drain
  - 2.8.4 Fan Controls
    - 2.8.4.1 Hood Exhaust and Supply Fans
    - 2.8.4.2 Hood Exhaust and Supply Duct
- 2.9 GAS BURNERS
- 2.10 WATER FILTERS
- 2.11 PREFABRICATED WALK-IN REFRIGERATORS AND FREEZERS
  - 2.11.1 Panel Construction
  - 2.11.2 Doors
  - 2.11.3 Lights
  - 2.11.4 Pressure Relief Port
  - 2.11.5 Refrigeration
  - 2.11.6 Monitoring System
  - 2.11.7 Personnel Alarm
- 2.12 LIST OF EQUIPMENT AND FIXTURES
  - 2.12.1 Format
  - 2.12.2 Abbreviations
  - 2.12.3 Definitions
  - 2.12.4 Dimensions
  - 2.12.5 Logistical Classification
  - 2.12.6 Schedule

## PART 3 EXECUTION

- 3.1 INSTALLATION
  - 3.1.1 General
  - 3.1.2 Cutting and Patching of Construction

- 3.1.3 Setting and Connecting
- 3.1.4 Welding Field Joints
- 3.1.5 Brazing
- 3.1.6 Cleaning and Adjusting
- 3.1.7 Installation of Hoods
- 3.1.8 Floor Screeds
- 3.2 FIELD INSPECTIONS AND TESTS
  - 3.2.1 Inspections
  - 3.2.2 Tests
    - 3.2.2.1 Walk-In [Refrigerator] [and] [Freezer] Test[s]
- 3.3 SCHEDULE

-- End of Section Table of Contents --

\*\*\*\*\*  
 USACE / NAVFAC / AFCESA UFGS-11400N (September 1999)  
 -----  
 Preparing Activity: NAVFAC Replacing without revision  
 NFGS of same number and date

# UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

\*\*\*\*\*

## SECTION 11400N

### FOOD SERVICE EQUIPMENT 09/99

\*\*\*\*\*

NOTE: This guide specification covers the requirements for commercial food service equipment used for all land-based naval facilities.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

\*\*\*\*\*

\*\*\*\*\*

NOTE: Details of particular equipment and installations are provided on Naval Food Service Division drawings. These NAVFSD drawings should be used as a basis for the project details. Contact NAVFSD at commercial telephone (717) 790-7580 or DSN 430-7580.

#### | <u>Equipment Item</u> | <u>NAVFSSO Dwg. File</u> | |-----------------------|--------------------------| |-----------------------|--------------------------|

- |                                     |     |
|-------------------------------------|-----|
| 1. Clean Gear Dresser               | 541 |
| 2. Soiled Dishtable Assembly        | 541 |
| 3. Soiled Gear Scrapping Assembly   | 541 |
| 4. Clean Gear Table                 | 553 |
| 5. Utensil Wash Table               | 553 |
| 6. Service Stand                    | 851 |
| 7. Counter Front With Tray Slide    | 857 |
| 8. Steam Kettles and Water Metering | 983 |

\*\*\*\*\*

\*\*\*\*\*

NOTE: On the drawings, show:

1. A 1:50 1/4 inch scale floor plan with layout of all food service equipment and Naval Equipment Symbols.
2. Food Service Equipment Schedule laid out in accord with NAVFSSO requirements.
3. Floor, wall, and ceiling penetrations. Include mounting height and size of pass through window at soiled dish counter.
4. Raised bases, retainer curbs, or depressions.
5. Recessed, grated floor drains required for equipment.
6. Exhaust fan curbs, supply fan curbs, exhaust duct, supply duct, and ductwork material.
7. Fire system CO2 tanks, actuating stations.
8. Hoods, plumbing enclosure housing and control panel of automatic washdown system.
9. Insulated floors, including under-floor perforated drains and vent pipes.
10. Disposer control centers.
11. Disconnect switches.
12. Electrical chases and raceways and plumbing chases.
13. Remote compressors and refrigeration systems.
14. Utility connections to building water, sanitary, gas, electrical, sprinkler, fire alarm, oil, compressed air, steam, and other utility systems. Convenience outlets at point of use for plug-in equipment.
15. Remote syrup containers and associated supply lines to drink dispenser(s).

\*\*\*\*\*

## PART 1 GENERAL

### 1.1 REFERENCES

\*\*\*\*\*

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest guide specification. Use of SpecsIntact automated reference checking is recommended for projects based on older guide specifications.

\*\*\*\*\*

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.18 (1984; R 1994) Cast Copper Alloy Solder Joint Pressure Fittings

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 15 (2001; Errata 2002) Safety Standard for Refrigeration Systems

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1001 (2002) Atmospheric Type Vacuum Breakers

ASSE 1009 (1990) Commercial Food Waste Grinder Units

AMERICAN WELDING SOCIETY (AWS)

AWS A5.8 (1992) Filler Metals for Brazing and Braze Welding

ASME INTERNATIONAL (ASME)

ASME A112.19.3M (2001) Stainless Steel Fixtures (Designed for Residential Use)

ASME B16.15 (1985; R 1994) Cast Bronze Threaded Fittings Classes 125 and 250

ASME B16.22 (2002) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

ASME B16.26 (1988) Cast Copper Alloy Fittings for Flared Copper Tubes

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M (2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 167 (1999) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

ASTM A 270 (2003) Seamless and Welded Austenitic Stainless Steel Sanitary Tubing

ASTM A 276 (2003) Stainless Steel Bars and Shapes

ASTM A 36/A 36M (2003a) Carbon Structural Steel

ASTM A 653/A 653M (2003) Steel Sheet, Zinc-Coated

	(Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B 32	(2003) Solder Metal
ASTM B 43	(1998) Seamless Red Brass Pipe, Standard Sizes
ASTM B 88	(2002) Seamless Copper Water Tube
ASTM B 88M	(1999) Seamless Copper Water Tube (Metric)

#### NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2	(2000) Industrial Controls and Systems: Controllers, Contactors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993; R 2001) Industrial Control and Systems: Enclosures
NEMA LD 3	(2000) High-Pressure Decorative Laminates
NEMA MG 1	(2003) Motors and Generators

#### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 96	(2001) Ventilation Control and Fire Protection of Commercial Cooking Operations
---------	--

#### NSF INTERNATIONAL (NSF)

NSF 2	(2002e) Food Equipment
NSF 35	(1999) High Pressure Decorative Laminates for Surfacing Food Service Equipment
NSF 7	(2001) Commercial Refrigerators and Freezers

#### SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA HVAC Duct Const Stds	(1995, 2nd Ed) HVAC Duct Construction Standards - Metal and Flexible
SMACNA KEFG	(2001, 1st Ed) Kitchen Ventilation Systems and Food Service Equipment Guidelines

#### UNDERWRITERS LABORATORIES (UL)

UL 1570	(1995; Rev thru Nov 1999) Fluorescent Lighting Fixtures
UL 1571	(1995; Rev thru Nov 1999) Incandescent Lighting Fixtures
UL 471	(1995; Rev thru Nov 2001) Commercial

## Refrigerators and Freezers

UL 710

(1995; Rev thru Apr 1999) Exhaust Hoods  
for Commercial Cooking Equipment

### 1.2 GENERAL REQUIREMENTS

#### 1.2.1 Mechanical General Requirements

Section 15050N BASIC MECHANICAL MATERIALS AND METHODS, applies to this section.

#### 1.2.2 Electrical General Requirements

Section 16050N BASIC ELECTRICAL MATERIALS AND METHODS, applies to this section.

#### [1.2.3 Electromagnetic Interference Suppression

\*\*\*\*\*  
NOTE: Electromagnetic interference suppression  
should be required only when there is a probability  
of radio frequency interference with the using  
activities radio communications systems.  
\*\*\*\*\*

Provide in accord with Section 01575N TEMPORARY ENVIRONMENTAL CONTROLS.

#### ]1.2.4 Fungus Treatment of Electrical Components

\*\*\*\*\*  
NOTE: Fungus treatment of electrical components  
should be required only in tropical climates.  
\*\*\*\*\*

Provide.

### ]1.3 DESCRIPTION OF WORK

The work includes [furnishing and] [installing] [and modifying existing] food service equipment and related work. Provide rough-in and make utility connections to equipment in accord with requirements specified in other sections of this specification and in accord with the physical dimensions, capacities and other requirements of the equipment furnished.

### 1.4 SUBMITTALS

\*\*\*\*\*  
NOTE: Submittals must be limited to those necessary  
for adequate quality control. The importance of an  
item in the project should be one of the primary  
factors in determining if a submittal for the item  
should be required.

A "G" following a submittal item indicates that the  
submittal requires Government approval. Some  
submittals are already marked with a "G". Only  
delete an existing "G" if the submittal item is not  
complex and can be reviewed through the Contractor's

Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy projects.

\*\*\*\*\*

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

Food service equipment layout; G

Food Service Equipment Schedule; G

Submit in the same format as the equipment schedule on the drawings.

Food service equipment utilities; G

Custom fabricated equipment; G

#### SD-03 Product Data

Equipment and fixtures; G

Garbage disposal; G

Hoods; G

Walk-in refrigerators; G

Walk-in freezers; G

Designate data using the Naval Equipment Symbol.

#### SD-06 Test Reports

Food service equipment tests; G

Submit certified copies of test reports for equipment and material, except for reports required by Military or Federal specifications.

#### SD-10 Operation and Maintenance Data

Food service equipment and fixtures, Data Package 2; G

Submit in accordance with Section 01781 OPERATION AND MAINTENANCE DATA. Submit for each piece of equipment furnished by the Contractor.

### 1.5 DRAWINGS

#### 1.5.1 Food Service Equipment Layout

\*\*\*\*\*  
**NOTE: Since the layout drawings must be approved prior to other submittals, the date set for their submission should precede the due date set for other submittals, by 30 days if possible.**  
\*\*\*\*\*

Submit, within [60] [\_\_\_\_] days of award of contract, minimum 1:50 1/4 inch scale layout drawings of the rooms or spaces containing food service equipment. Indicate detailed arrangement of space and food service equipment, in exact locations. Include elevations to establish that equipment will fit allotted spaces with clearance for installation, operation, and maintenance. On layout drawing, use Naval Equipment Symbols designated herein.

#### 1.5.2 Utilities

Submit after approval of the food service equipment layout drawings. Draw at a minimum 1:50 1/4 inch scale. Show the exact locations of refrigerant, syrup, plumbing, gas, steam, and electric utilities necessary to connect and operate each piece of equipment in accord with the requirements listed in paragraph entitled "List of Equipment and Fixtures," except as otherwise required by the equipment manufacturer's penetrations of concrete floor and concrete and masonry walls. Indicate dimensions and details of masonry and concrete bases and floor depressions.

#### 1.5.3 Custom Fabricated Equipment

Submit after approval of food service equipment layout drawings. Submit for food service equipment not manufactured as standard production and catalog items by manufacturers of commercial food service equipment, referenced as "custom fabricated equipment" in this specification. Draw custom fabricated equipment at a minimum 1:20 1/2 inch scale and include a plan view and front, rear, and side elevations. Fully dimension drawings and label all parts as to materials and methods of construction.

### 1.6 DELIVERY, STORAGE, AND HANDLING

Inspect each piece of equipment upon delivery. Conform to Section 15050N BASIC MECHANICAL MATERIALS AND METHODS. Follow equipment manufacturer's recommendations to protect materials and equipment and prevent damage.

## PART 2 PRODUCTS

### 2.1 MATERIALS

Provide material listed below.

#### 2.1.1 Stainless Steel

##### 2.1.1.1 Sheets

ASTM A 167, 18-8 Composition, Type 302 or 304 or 316, with a No. 4 finish on the exposed face.

##### 2.1.1.2 Tubing

ASTM A 270.

##### 2.1.1.3 Bars

ASTM A 276, Type 302 or Type 304 or Type 316.

#### 2.1.2 Zinc-Coated Steel

##### 2.1.2.1 Sheets

ASTM A 653/A 653M, coating Class Z275 G90.

##### 2.1.2.2 Shapes

ASTM A 36/A 36M, zinc-coated in accord with ASTM A 123/A 123M.

#### 2.1.3 Brass Piping

##### 2.1.3.1 Pipe

ASTM B 43.

##### 2.1.3.2 Fittings

ASME B16.15.

#### 2.1.4 Copper Tubing

##### 2.1.4.1 Tube

ASTM B 88/ASTM B 88, Type K, annealed, for buried or embedded in concrete installation and Type L, hard drawn, for above grade installation.

##### 2.1.4.2 Fittings

ANSI B16.18, above grade, ASME B16.22 or ASME B16.26, above or below grade.

#### 2.1.5 Lead-Free Solder

ASTM B 32, 95.5 tin-antimony solder or other "lead-free" solder. Use for all potable water copper tubing and fitting connections, and for solder joints in contact with food.

#### 2.1.6 Tin-Lead Solder

ASTM B 32, alloy grade 50B for temperatures up to 65 degrees C 150 degrees F and alloy grade 95TA for temperatures over 65 degrees C 150 degrees F.

#### 2.1.7 Silver Solder

AWS A5.8, 15 percent silver base brazing alloy, melting point not less than 540 degrees C 1000 degrees F.

#### 2.1.8 Laminated Plastic

NEMA LD 3 and NSF 35.

### 2.2 FABRICATION

Fabricate Custom fabricated and commercial equipment in accord with NSF 2.

#### 2.2.1 Welding

Provide at sink inserts, where sheet size necessitates a joint, and at joints of hoods. Make welds watertight.

##### 2.2.1.1 Welds

Use tungsten inert gas process. Use filler metal compatible with the material being welded. Do not use carbon arc welding on tops of counters, tables, drainboards, exposed shelving, or sinks. Make welds ductile and of same color as adjoining surfaces.

##### 2.2.1.2 Joints

Penetrate entire thickness for the entire length of the joint; make joints flat, continuous and homogeneous with the sheet metal without reliance on straps under seams, filling in with solder, or spot welding. When stainless steel is joined to dissimilar metals, use stainless steel for fastening devices and welding material.

##### 2.2.1.3 Hidden Surface Welds

Wherever welds occur on surfaces not finished by grinding or polishing, coat such welds and the accompanying discoloration in the factory with a metallic-based paint in such a manner as to prevent the possibility of progressive corrosion of such joints.

##### 2.2.1.4 Grinding, Polishing, and Finishing

Grind exposed welded joints flush with the adjoining material and finish and polish to match the adjoining surface. In grinding avoid excessive heating of the metal and metal discoloration. Abrasives, wheels, and belts used in grinding shall be iron-free and shall not have been used on carbon steel. Grind off excess metal and smooth to a No. 4 finish. Remove imperfections such as pits, runs, sputter, cracks, low spots, voids and buckles. Remove the grain of rough grinding by several successively finer polishing operations until specified finish is attained.

##### 2.2.1.5 Protection Against Corrosion

Wherever a welding operation occurs on stainless steel, the possibility of

corrosion shall be entirely eliminated. Bolts and screws may be welded by any accepted process that will minimize the possibility of carbide precipitation. Welds in galvanized steel made after galvanizing, and the adjacent areas where galvanizing is damaged shall be thoroughly cleaned and coated with a polyurethane coating.

#### 2.2.2 Soldering

Use tin-lead soft solder with 50 percent tin, except that solder which will be in contact with potable water, ice, or food products shall be lead-free.

##### 2.2.2.1 Soldering Stainless Steel

Clean stainless steel of discoloration and then apply a suitable soldering flux. After soldering has been completed, wash away excess and remaining flux and clean the soldered joint and adjacent metallic surfaces with a liquid alkaline or neutralizing reagent, to prevent any attack on the surrounding metallic surfaces by the soldering flux.

##### 2.2.2.2 Soldered Joints

Use only as filler to prevent leakage and for no other purpose.

#### 2.2.3 Brazing

Use only to join copper tubing to brass and bronze connection fittings. Accomplish with silver solder. Do not use in lieu of a welding operation.

#### 2.2.4 Chromium Plating

Apply chromium plating over nickel plating.

#### 2.2.5 Butt and Contact Joints, Bends, and Edges

Butt joints and contact joints shall be close fitting. Brake bends shall be free of open-texture or orange peel appearance. Sheared edges shall be free of burrs, projections, and fins. Miters or bullnosed corners shall be neatly finished, with the under edge of the material ground to a uniform condition, and without overlapping material and cracks.

#### 2.2.6 Bolts, Screws, and Rivets

Wherever possible, exposed surfaces shall be free of bolts, screws, and rivet heads. Wherever bolts or screws are used, use stainless steel concealed type. On exposed, exterior surfaces, use stainless steel rivet heads where conditions do not permit the use of concealed fasteners. Where threads of bolts and screws occur on the inside of fixtures, either visible or exposed, cap with lock washer and chromium-plated brass or bronze acorn nut. Where bolts or screws are welded to underside of trim or tops, reverse side of weld shall be finished and undepressed.

#### 2.2.7 Legs

Install counter-supported food service equipment on 100 mm 4 inch high stainless steel legs of round stock, able to support the equipment when filled.

## 2.3 UTILITY REQUIREMENTS

### 2.3.1 Electrical Requirements

Provide electrical components, such as motors, motor starters, pushbutton control stations, float and pressure switches, solenoid valves, electrical disconnecting means, and other devices functioning to control the associated equipment, as a part of the equipment. Motors shall conform to NEMA MG 1. Motors rated at 460 volts shall be provided with pushbutton controls and fused motor control circuit transformers, with secondary rated at 120 volts. Motors shall be continuous duty, splashproof construction, squirrel cage induction types or silicon control rectifier controlled direct current motors with ball bearings. Wire motors, heating elements, controls or other electrical devices located on the equipment in the factory, with wiring extended to a single electrical connection point. Electrical components and wiring shall be in accord with Section 16402 INTERIOR DISTRIBUTION SYSTEM.

### 2.3.2 Plumbing Requirements

Furnish and install plumbing, piping and fixtures necessary for proper functioning of the equipment, such as faucets, control valves, sink strainers, valve-type waste outlets, vacuum breakers, pressure reducing valves, pressure and temperature relief valves, and steam traps, in accord with the requirements of Section 15400N PLUMBING SYSTEMS. Steam pressure shall be [\_\_\_\_ kilopascals] [\_\_\_\_ pounds per square inch gage] and water pressure shall be [\_\_\_\_ kilopascals] [\_\_\_\_ pounds per square inch gage] [as indicated]. Provide pressure reducing valve for equipment requiring reduced pressure. Protect water supplies to fixtures and equipment against back siphonage in accord with Section 15400N PLUMBING SYSTEMS. Provide hub drains or floor sinks under equipment requiring indirect drains in accord with Section 15400N PLUMBING SYSTEMS. Extend drain lines from equipment to hub drains or floor sinks. Exposed piping or tubing shall be chrome plated or copper. Concealed piping shall be copper tubing.

## 2.4 CUSTOM-FABRICATED COUNTERS, DISHWASHER COUNTERS, AND SINKS

### 2.4.1 Counter Tops

Fabricate of 1.8 mm 14 gage stainless steel, with all shop seams and corners welded, ground smooth, and polished.

### 2.4.2 Counter Edges

Miter and weld corners, grind smooth, and polish.

#### 2.4.2.1 Work, Landing, and Dump Tables

Roll down counter edges on work, landing, and dump tables 45 mm 1.75 inches at 180 degrees, with corners rounded and bullnosed.

#### 2.4.2.2 Cafeteria; Buffet; Hot and Cold Counters

Turn down counter edges on cafeteria, buffet, hot, and cold counters 2 inches at 90 degrees on a 6 mm 0.25 inch radius.

#### 2.4.2.3 Side and Back Splashes

Turn up counter edges to form side or backsplashes at 90 degrees on a 15 mm

0.625 inch radius with top edge turned back 50 mm 2 inches at 90 degrees with ends closed. Turn up 150 mm 6 inches unless 250 mm 10 inches is called for.

#### 2.4.2.4 Dish Tables, Vegetable, and Pot Sinks

Turn up counter edges on dishtables and vegetable and pot sinks 75 mm 3 inches at 90 degrees on a 15 mm 0.625 inch radius with top edge rolled 45 mm 1.75 inch at 180 degrees to form a rolled rim. Turn up back edge 250 mm 10 inches at 90 degrees on a 15 mm 0.625 inch radius with top edge turned back 55 mm 2.2 inches at 45 degrees with ends closed.

#### 2.4.3 Counter Top Support

Provide supports under all edges of counter tops and tables, and at cross members. Stud-weld counter top to supports. Provide either of following types.

##### 2.4.3.1 Channels

25 by 25 mm One by one inch, 2.5 mm thick 12 gage galvanized steel channel. Space cross members 600 mm 30 inches on-center.

##### 2.4.3.2 Angles

38 by 38 by 3 mm 1.5 by 1.5 by 0.125 inch galvanized steel angles. Space cross members at 600 mm 2 feet on-center.

#### 2.4.4 Counter Bases

\*\*\*\*\*  
**NOTE: Indicate the type desired for the individual pieces of equipment or specify which is to be used. Alternatively, both types may be specified as a Contractor's option.**  
\*\*\*\*\*

##### 2.4.4.1 Closed Counter Bases

Fabricate with 38 by 38 by 3 mm 1.5 by 1.5 by 0.125 inch galvanized steel angles with all corners mitered, welded and ground smooth. Provide horizontal and vertical angles at 600 mm 2 feet on-center. Fabricate closure panels of 1.2 mm thick 18 gage stainless steel or 1.2 m thick 18 gage galvanized steel with laminated plastic material in accord with NSF 35. Fabricate joint trim of 50 mm 2 inch wide, 1.8 mm thick 14 gage stainless steel; attach with concealed bolts or screws. Enclosed bases shall be double-wall at ends and partitions. Weld support legs to body support angles. [Use closed-type bases on \_\_\_\_\_.]

##### 2.4.4.2 Open Counter Bases

Fabricate and crossbrace with 40 mm 1.625 inch outside diameter, 1.5 mm thick 16 gage stainless steel tubing. Weld crossbraces to legs to reinforce each leg. Weld legs to gussets. Make gussets of stainless steel, fully enclosed, a minimum of 75 mm 3 inches in diameter at top, reinforced with bushing, and continuously welded to support channels located under the counter top. [Use open-type bases on \_\_\_\_\_.]

#### 2.4.5 Legs

Fabricate of 1.5 mm thick 16 gage, 40 mm 1.625 inch outside diameter stainless steel tubing. Continuously weld to angles on closed bases and gussets on open bases. Finish bottom of legs smoothly. Overlap stem of feet to provide a sanitary fitting.

#### 2.4.6 Pedestal Bases

Fabricate of 2.5 mm thick 12 gage stainless steel for serving line counters. Make pedestal 200 mm high, 250 mm wide, and 600 mm long 8 inches high, 10 inches wide, and 24 inches long with top and bottom edges flanged 38 mm 1.5 inch to the inside at 90 degrees. Provide holes in both flanges for 13 mm 0.5 inch lag screws. Locate utility stub-ups inside pedestal and run to designated equipment.

#### 2.4.7 Feet

Die-stamped stainless steel, bullet shaped, fully enclosed, with slightly rounded bottom. Fit top of feet with male threaded stem to mate with end of legs and provide for a 25 mm 1 inch adjustment without threads being exposed.

#### 2.4.8 Casters

Provide heavy-duty, ball bearing, disc wheel, with replaceable grease-proof rubber or neoprene tires and brakes. Tires shall be minimum 125 mm 5 inch diameter and minimum 25 mm one inch width of tread 90 kilograms 200 pounds capacity per caster. Provide pressure-type grease fittings, threaded guards, and plated finish.

#### 2.4.9 Open Base Shelves

Fabricate of 1.5 mm thick 16 gage stainless steel with all edges turned down 50 mm 2 inches at 90 degrees on a 6 mm 0.25 inch radius with bottom edges turned back 13 mm 0.5 inch at 45 degrees. Notch corners 90 degrees, and intersections 180 degrees. Weld to legs at corners and intersections. Locate legs maximum 1200 mm 48 inches apart. Shelving to be removable without use of tools.

#### 2.4.10 Closed Base Interior Shelves

Fabricate of 1.5 mm thick 16 gage stainless steel. Turn back and side edges up 50 mm 2 inches at 90 degrees on a 6 mm 0.25 inch radius. Turn front edge down 50 mm 2 inches at 90 degrees on a 6 mm 0.25 inch radius and back 6 mm 0.25 inch at 45 degrees. Reinforce shelves longer than 750 mm 30 inches with 38 by 38 by 3 mm 1.5 by 1.5 by 0.125 inch galvanized steel angles under front edge and horizontal center of the shelf. Shelving to be removable without use of tools.

#### 2.4.11 Shelf Pan Slides

1.8 mm thick 14 gage stainless steel, 38 by 38 by 3 mm 1.5 by 1.5 by 0.125 inch angles, with front and back corners rounded and finished smooth. Set angles at 50 mm 2 inches on-center for 450 by 660 mm 18 by 26 inch bun pans and 300 by 500 mm 12 by 20 inch serving pans.

#### 2.4.12 Drawers

Die-stamped 1.2 mm thick 18 gage stainless steel, 500 by 500 by 125 mm 20 by 20 by 5 inch deep. Drawer body shall be easily removed for cleaning with top edges flanged out 13 mm 0.5 inch. Round interior horizontal corners on a 25 mm one inch radius and interior vertical corners on a 50 mm 2 inch radius. Fabricate supporting frame of 1.8 mm thick 14 gage stainless steel channel. Weld drawer face to frame. Die-stamp drawer face with raised border for rigidity. Die-form an integral open sanitary handle into face. Mount drawer slides with ball bearing nylon or stainless steel rollers on channel frame. Slides and frame shall allow for full opening of drawer, and be reinforced to support a weight of 22.5 kilograms 50 pounds when fully extended. Provide stops for each drawer at fully open position. Enclose drawers on open-base tables in 1.2 mm thick 18 gage stainless steel housing.

#### 2.4.13 Doors

Stainless steel double-cased. 1.2 mm thick 18 gage outer pan with corners welded, ground smooth and polished. 0.9 mm thick 20 gage inner pan fitted tightly into outer pan with core of sound deadening material. Tack-weld outer and inner pans together with solder-filled seam. Provide doors approximately 20 mm 0.75 inch thick and fitted with flush-recessed, stainless steel door pulls. Mount doors on stainless steel piano or concealed hinges.

#### 2.4.14 Tray Slide

\*\*\*\*\*  
**NOTE: Tray slides for Enlisted General Messes shall be installed as an integral fabrication of serving line counterfront; NAVFSSO drawing 11103-857 and as specified in the applicable Standard for other equipment.**  
\*\*\*\*\*

[Solid] [Tube] type, 300 mm 12 inch wide; mounted 865 mm 34 inches above floor. Extend to full length of supporting counter.

##### 2.4.14.1 Solid Type

1.8 mm thick 14 gage stainless steel with front and back edges rolled 45 mm 1.75 inch at 180 degrees. Top edge of roll shall be 10 mm 0.375 inch above flat surface of slide. Provide three inverted "V" forms, approximately 10 mm 0.375 inch high, in flat surface of slide as running surface for trays. Close ends of slide.

##### 2.4.14.2 Tube Type

Provide four 25 mm one inch diameter 1.5 mm thick 16 gage stainless steel tubes with supporting hardware. Close both ends of each tube.

##### 2.4.14.3 Brackets

Stainless steel or chromium plated. Secure to counter with stainless steel bolts. Space 1200 mm 4 feet on-center. Provide [stationary] [fold-down] type extending under full width of tray slide.

#### 2.4.15 Protector Shelf

Fabricate top of 1.8 mm thick 14 gage stainless steel with all edges rolled down 180 degrees for 38 mm 1.5 inches with bullnosed corners. Shelf to be minimum 250 mm 10 inches wide.

##### 2.4.15.1 Shelf Frame

Provide 25 by 25 mm one by one inch, 1.5 mm thick 16 gage stainless steel square tubing under all edges of shelf at 750 mm 30 inches on center.

##### 2.4.15.2 Shelf Frame Support

Form front uprights of 30 by 30 mm 1.25 by 1.25 inch, 1.5 mm thick 16 gage stainless steel tubing. Form back uprights of 25 by 25 mm one by one inch, 1.5 mm thick 16 gage stainless steel square tubing. Provide a horizontal brace, 25 mm one inch above bottom of front uprights. Space front uprights 750 mm 30 inches apart or less, fit with die-formed flanges to be attached to counter top from underside with bolts, and slope 10 degrees to rear.

##### 2.4.15.3 Protector Glass

6 mm 0.25 inch thick, tempered plate glass. Frame edges of glass with 13 mm 0.5 inch, 0.09 mm thick 20 gage stainless steel channel. Glass to be easily replaced in the event of breakage. Provide glass end panels.

#### 2.4.16 Drip Gutter

Provide as integral part of counter tops, where indicated. Provide a 25 mm one inch brass drain tube centered in bottom of gutter with bottom pitched to drain. Drip gutter to be 100 mm wide, 25 mm deep 4 inches wide, one inch deep, and length indicated. Provide removable, stainless steel, die-stamped, anti-splash strainer with finger hole.

#### [2.4.17 Sound-Deadening of Counters and Sinks

\*\*\*\*\*  
**NOTE: Include sound deadening only when dining area  
is exposed to food service equipment.**  
\*\*\*\*\*

Sound-deaden all counter tops and sinks with minimum of 3 mm 0.125 inch thick, hard-drying, sound-deadening mastic material. Spray mastic onto surface after reinforcing members have been applied. Dry smoothly without leaving crevices.

#### ]2.4.18 Dishwasher Counters

Rolled front rim, 250 mm 10 inch high backsplash, support channels and undershelves where indicated.

##### 2.4.18.1 Drain Troughs

Provide across each end of counters that attach to dishwasher.

##### 2.4.18.2 Scrap Sink

Provide 1.8 mm thick 14 gage stainless steel sink, 500 by 500 by 250 mm 20 by 20 by 10 inches deep, integral with soiled dish counter top. Provide

two removable stainless steel scrap baskets, 500 by 250 by 125 mm 20 by 10 by 5 inches high, with 25 mm one inch diameter stainless steel tubing handles. Provide disposer attachment ring in bottom of sink. Provide a pre-rinse hose complete with spray head and mixing valve directly above sink and attached to dish counter.

#### 2.4.18.3 Disposer Cone

\*\*\*\*\*  
**NOTE: Provide in counter top of pot and pan sink  
and soiled dish counter, if desired.**  
\*\*\*\*\*

Provide in counter top, 450 mm 18 inches in diameter, complete with pre-rinse spray hose.

#### 2.4.18.4 Scrap Trough

\*\*\*\*\*  
**NOTE: Provide in counter top of soiled dish  
counter, if desired.**  
\*\*\*\*\*

Provide integrally with counter, 225 mm wide, 150 mm deep 9 inches wide, 6 inches deep, and sloped toward discharge end. Provide disposer attachment ring in discharge end of trough and a fixed-direction water inlet at top of trough for positive flushing action.

#### 2.4.18.5 Sloped Cup/Glass Racking Shelf

Fabricate with 1.5 mm thick 16 gage stainless steel bottom and 38 by 38 by 3 mm 1.5 by 1.5 by 0.125 inch angle framing supports. Construct with 25 degree slope down toward operator, with bottom edge 450 mm 18 inches above soiled dish table top, and to accommodate 500 by 500 mm 20 by 20 inch dishwashing racks. Provide a 38 mm 1.5 inch retainer edge, turned up. Fit inside corner with drain plumbed to discharge into [sink] [floor drain].

#### 2.4.18.6 Undershelves

Provide stainless steel solid type.

### 2.5 PASS-THROUGH WINDOWS

Except for sill of soiled dish counter, fabricate a mitered window frame of 1.8 mm thick 14 gage stainless steel channel forming a 85 mm 3.5 inch casing on each side of wall. Return flange 13 mm 0.5 inch, to wall. Weld joints; join only at corners of opening. Seal in accord with Section 07920 JOINT SEALANTS.

#### 2.5.1 Windows for Endless Belt Conveyors

Locate and size opening to allow 13 mm 0.5 inch clearance at each side and below conveyor and 300 mm 12 inch space above conveyor.

#### 2.5.2 Windows for Soiled Dish Counter

Fabricate sill as integral extension of counter. At face of wall opposite counter, turn sill 13 mm 0.5 inch up, then down to form 100 mm 4 inch wide mitered casing.

## 2.6 SINKS

\*\*\*\*\*  
**NOTE: Handwashing sinks must be provided behind each serving line and in each food preparation area. Each handwashing sink must be provided with soap dispensers and either towel dispensers or electric hand dryers specified in Section 10800, " Toilet and Bath Accessories."**  
\*\*\*\*\*

Provide sizes and mountings as indicated; provide in accord with requirements of NSF 2.

### 2.6.1 Sink Body

Provide in accord with ASME A112.19.3M. Fabricate of 1.8 mm thick 14 gage stainless steel. Round vertical and horizontal corners with a radius of not less than 19 mm 0.75 inch. Provide double walls at partitions. Pitch sink bottom to drain into stainless steel drain outlet with cup strainer and adjustable P-trap. Material for traps, valves, and plugs shall be chrome-plated copper alloy or stainless steel. Overflow piping and fittings to have a minimum diameter of 38 mm 1.5 inches and a minimum thickness of 1.15 mm 0.045 inch, with connection tubes not less than 0.9 mm 0.036 inch thick, complete with removable perforated metal strainer plate.

### 2.6.2 Mounting

#### 2.6.2.1 Leg Mounting

Sink legs to be as specified for counters, except weld closed gussets to support channels.

#### 2.6.2.2 Wall Mounting

Provide brackets.

#### 2.6.2.3 Counter Mounting

Provide sink body [set in counter] [integral with counter].

### 2.6.3 Sink Drain Valves

\*\*\*\*\*  
**NOTE: Provide quick-opening drain valves in pot and pan sinks and in other sinks as desired.**  
\*\*\*\*\*

Provide quick-opening valve with jam-nut and washer. Drain shall have a bar strainer and quick-opening gate valve with non-rising stem, fully enclosed mechanism, and extension-lever handle for operation from in front of sink.

### 2.6.4 Drains

Provide cleanout.

#### 2.6.5 Faucets

Provide [splashback] [counter top] [and] [ledge] mounted [as indicated]. Faucets shall have two valves and spout. Provide faucet for each sink compartment [unless otherwise indicated]. Spout outlet of faucets shall be located 65 mm 2.5 inches above rim of sink. Provide combination-fitting faucet with concealed valve bodies and swinging elevated spout. Use chrome-plated copper alloy or stainless steel for faucets, spouts, handles, locknuts, and washers. Use, for each valve, replaceable seats accessible from front or top, and inlets with union-couplings with 13 mm 0.5 inch internal pipe threads. Spouts shall have close-fitting sleeve bearing at least 25 mm in diameter and 20 mm long one inch in diameter and 0.75 inch long and swivel-joint with adjustable packing.

Nozzle of spout shall have an anti-splash device without hose thread. Inside diameter of spout shall be 13 mm 0.5 inch, minimum. Faucets shall have marked lever handles, with or without hood.

#### 2.6.6 Hand Sink

Provide goose-neck faucet spout and aerator.

#### 2.6.7 Pot-Washing Sink

Fabricate in accord with paragraph "CUSTOM-FABRICATED COUNTERS, DISHWASHER COUNTERS, AND SINKS." Construct of 1.8 mm thick 14 gage stainless steel with three integral compartments. Provide front rolled rim and 250 mm 10 inch high backsplash. Third compartment will be final rinse compartment. Equip third compartment with removable, stainless steel filter screens.

##### 2.6.7.1 Third Compartment Water Booster Heater

\*\*\*\*\*  
**NOTE: Plumb heater sump drain to discharge into  
floor drain or floor sink.**  
\*\*\*\*\*

Provide, under rinse sink, heater to boost and maintain rinse water at minimum temperature of 82 degrees C 180 degrees F. Include automatic low water safety shut-off, control thermostat, reservoir drain, and light to indicate when rinse water has reached 82 degrees C 180 degrees F.

#### 2.6.8 Vegetable Preparation Sink

Provide 2-compartment sink.

#### 2.7 GARBAGE DISPOSAL MACHINES

\*\*\*\*\*  
**NOTE: When scrap trough is located on front of  
soiled dish table with a disposer in center and  
scrapping being done on each side, the disposer  
should be provided with an off-set head so disposer  
does not extend beyond dishtable.**  
\*\*\*\*\*

Provide floor-mounted type conforming to ASSE 1009, with cast alloy body supported on adjustable tubular legs. Attach waste chamber lid with quick-release clamps. Connect hopper to disposal with a flexible sleeve of

molded neoprene, held in place with stainless steel clamps. [Provide an offset head.]

#### 2.7.1 Disposal Cone

Fabricate with approximate diameters of 450 mm 18 inches inside unit and 200 mm 8 inches at throat. Provide neoprene silver trap at throat and water swirl inlet in cone to create counterclockwise rotation. Secure cone to disposer with flexible connector sleeve and stainless steel clamps.

#### 2.7.2 Motor

Mount with 75 mm 3 inch minimum clearance above floor. Provide with magnetic starter with overload and under-voltage protection timer for 0 to 5 minutes, panel cover interlock, fused disconnect, prewired solenoid, vacuum breaker, two water flow controls, and automatic reversing action. Rotor shall be cast alloy carrying rigid impact bars and fixed directly onto motor shaft. Provide motors of the following minimum sizes on disposals at locations listed:

- a. Pot and pan sink: 3.75 kw 5 horsepower
- b. Soiled dishtable: 5.60 kw 7.5 horsepower.

#### 2.7.3 Disposal Control Center

Include time delay relay, start and stop buttons, panel cover interlock with fused safety disconnect switch and circuit breaker, door locking feature that prevents opening door with power on, full voltage magnetic starter with both overload and under-voltage protection, and solenoid valve. Control center shall be waterproof and fabricated using stainless steel and in accord with NEMA ICS 6. Controls shall conform to NEMA ICS 2.

### 2.8 HOODS

\*\*\*\*\*  
**NOTE: Seismic restraints for kitchen hoods shall conform to Guidelines for Seismic Restraints of Kitchen Equipment (SMACNA Los Angeles Chapter). See Appendix 1 of SMACNA Fabrication Guidelines. Include requirement in seismic zones 3 and 4.**  
\*\*\*\*\*

Conform to NFPA 96 and UL 710. Conform to SMACNA HVAC Duct Const Stds. [Provide seismic restraints in accord with SMACNA KEFG.] The hood shall not vary from design listing of air requirements or static pressure by more than five percent. Fabricate from 1.2 mm thick 18 gage stainless steel. Run electrical wiring in conduit or raceways. When total hood length is more than 3600 mm 12 feet long, provide hoods individually complete in all respects, of approximately equal length less than 3600 mm 12 feet long, and mounted end to end.

#### 2.8.1 Centrifugal Grease-Extracting Hoods

Fabricate in factory. Provide high-velocity type with average throat inlet air velocity of [5] [\_\_\_\_\_] mps [1,000] [\_\_\_\_\_] fpm and duct velocity of [9] [\_\_\_\_\_] mps [1,800] [\_\_\_\_\_] fpm. Provide air inlet above and parallel to equipment for full length of hood. Provide hood which will remove 95 percent of extraneous matter in air with non-removable grease-extracting

baffles located in plenum chamber. The use of filters, cartridges, rotating parts, removable parts, or constantly running water is not acceptable.

#### 2.8.1.1 Types

\*\*\*\*\*  
**NOTE: Delete types not indicated for the project.**  
**If a type is not used, state "not used" at the**  
**subparagraph, to avoid renumbering.**  
\*\*\*\*\*

Provide the following hood types as indicated:

- a. Serve-Over Shelf; Type 1: Provide over [charbroilers,] [fryers,] [\_\_\_\_\_,] [and] [griddles] on serving lines. Mount hood 1370 to 1450 mm 54 to 57 inches above finished floor.
- b. Island; Type 2: Provide over [steam-jacketed kettles,] [fry pans,] [ovens,] [broilers,] [\_\_\_\_\_,] [and] [steamers] located remote from walls. Mount at height indicated.
- c. Wall-Mounted, Free-Standing; Type 3: Provide over [ranges,] [\_\_\_\_\_,] [broilers,] [doughnut fryers,] [griddles,] [ovens,] [steam-jacketed kettles,] [and] [fryers] located along wall. Mount at height indicated.
- d. Low Ceiling; Type 4: Provide over [\_\_\_\_\_] [and] [\_\_\_\_\_] where low ceiling restricts installation of Type 1, 2, or 3.

#### 2.8.1.2 Features

Provide the following:

- a. Automatic washdown system.
- b. Fan control.

\*\*\*\*\*  
**NOTE: Delete references to fire dampers in air**  
**inlet if fire dampers are included in exhaust**  
**ductwork connecting to hood.**  
\*\*\*\*\*

- c. Damper controls.
- d. Fan control station and plumbing enclosure.
- e. Fire protection system, for hoods over [tilting frying pans,] [charbroilers,] [fryers,] [griddles,] [doughnut fryers,] [\_\_\_\_\_,] [deep-fat fryers,] [and] [broilers].
- f. Vapor-proof lights.

#### 2.8.1.3 Automatic Washdown System

Provide system that automatically washes internal portions of hood for an adjustable period of between 0 and 15 minutes. Provide for activation by time clock or upon operation of fire damper.

a. Features of Operation:

(1) Shut off supply and exhaust fans, if running, at beginning of cleaning cycle.

(2) Subject accumulated contaminates on internal surfaces with water at [60] [82] degrees C [140] [180] degrees F and a water pressure of 0.275 MPa 40 psi. Provide pressure reducing valve.

(3) [Pump] [Inject] detergent into hot water supply line to create wash-water.

(4) Provide scrubbing action by directing wash-water through manifolds and then through spray nozzles placed so that all internal surfaces are reached with streams of wash-water.

(5) Collect wash-water and grease within hood and pipe to outside of hood to point indicated for indirect connection to building plumbing system.

(6) End wash cycle by timer.

b. Plumbing Components: Provide brass or stainless steel spray heads or nozzles and stainless steel distribution manifold in each hood. Provide the following in fan control station and plumbing enclosure:

(1) Water solenoid valve

(2) Shut-off valve

(3) Shock absorber

(4) Pressure gage

(5) Temperature gage

(6) Line strainer

(7) Vacuum breaker, conforming to ASSE 1001

(8) Detergent reservoir, one gallon minimum

(9) Detergent [pump] [injector]

(10) Check valve

(11) Timer

(12) Pressure reducing valve

2.8.1.4 Fan Control

Locate in fan control station and plumbing enclosure. Provide delay-time starter on starter leg of exhaust fan so supply fan will start first and run 5 seconds before exhaust fan starts, to insure the required balance in exhausted and make-up air flow. Provide the following operations:

- a. Interconnection with washdown system to effect shutoff.

\*\*\*\*\*  
NOTE: Delete references to fire dampers in air  
inlet if fire dampers are included in exhaust  
ductwork connecting to hood.  
\*\*\*\*\*

- b. Interconnection with fire dampers to effect shutoff of fans.
- c. Operation by time clock.
- d. Operation by manual push buttons labeled "start" and "stop".

#### 2.8.1.5 Fire Damper

\*\*\*\*\*  
NOTE: Delete references to damper if fire dampers  
are included in exhaust ductwork connecting to hood.  
\*\*\*\*\*

Provide mechanically driven damper and damper control. Activate by heat-sensing thermostat set to react to temperature of 176 degrees C 350 degrees F in exhaust duct at hood. Activation of damper shall cause the following additional actions:

- a. Shut off exhaust and supply fans of hood.
- b. Shut off fuel source and electric power to equipment under hood.
- c. Initiate automatic washdown system.

#### 2.8.1.6 Fan Control Station and Plumbing Enclosure

\*\*\*\*\*  
NOTE: Do not locate control cabinet for hoods on  
serving line tray slide support walls or on drop  
wall above serving line tray slide.  
\*\*\*\*\*

Provide flush-mounted enclosure. Wire and plumb in factory. Include the following:

- a. Plumbing components of washdown system.
- b. Components required for fan control, including manual push buttons and interlocks with other systems.
- c. Components required to operate fire protection system.
- d. Time clock capable of being programmed by the week to operate fan system and automatic washdown system and of maintaining time cycle after being overridden by manual push buttons.
- e. Labelled light indicating when exhaust fan and supply fan are operating.
- f. Labelled light indicating when automatic washdown system is operating.

### 2.8.1.7 Fire Protection Systems

\*\*\*\*\*  
**NOTE: Select fire protection system based on cost and local regulations. If kitchen can not tolerate time lost for clean-up in event of dry chemical release, or if kitchen return air is tied into building system return air, do not use that system. Ensure that actuating systems are indicated on drawings.**  
\*\*\*\*\*

Provide a pre-engineered [[dry] [wet] chemical system in accord with Section 13971N DRY CHEMICAL FIRE EXTINGUISHING FOR KITCHEN CABINET] [[liquid foam system] [water spray system] in accord with NFPA 96]. [Include water spray in plenum of hood.] Include micro-switch for electric power and fuel shut off to equipment under hood and a fuel shut-off and reset button. Exposed piping under hood and surface nozzles to be stainless steel or chrome plated. Paint exposed piping running to hood with rust-inhibiting aluminum paint. Provide electrical wiring, contactors, shunt breakers, electrical control for gas valves, and other electrical components required to install fire systems in accord with Section 16402 INTERIOR DISTRIBUTION SYSTEM.

- a. Actuating Stations. Provide manual actuating station and remote manual actuating station as indicated. Clearly label actuating station as "Hood Fire Protection" and specific device protected.

\*\*\*\*\*  
**NOTE: If water spray system is specified, make sure it is compatible with building sprinkler system.**  
\*\*\*\*\*

- b. Water Spray Fire System In Grease-Extracting Type Hood: Include wall-mounted control panel with pilot lights for indicating when system is operational, not operational, and on fire alert. Provide audible fire alarm, unions, hand valve, valve switch, and pressure switch. Include duct nozzles and plenum nozzles. Provide water pipe to control panel and from control panel to hood. Provide connections as part of building sprinkler system, Section 13930N WET-PIPE FIRE SUPPRESSION SPRINKLERS.

\*\*\*\*\*  
**NOTE: If exhaust hood fire system is to be connected to building alarm system, the work must be included in other sections and coordinated.**  
\*\*\*\*\*

- c. Alarm Connection: Provide capability to signal operational readiness and to generate electronic signal when hood fire system is activated. Provide connection point for building alarm system. Provide system to connection point and connect in accord with Section 13852N INTERIOR FIRE ALARM SYSTEM.

### 2.8.1.8 Vapor proof Lights

Provide, at Type 2 and Type 3 hoods, incandescent or fluorescent lights in accord with UL 1570 or UL 1571. Locate switches for operating hood lights

on face of hood in lower [right] [\_\_\_\_\_] corner.

## 2.8.2 Condensate Hoods and Exhausts

\*\*\*\*\*  
NOTE: Size exhaust and supply fans and exhaust and supply ducts in accord with hood manufacturer's recommendations, to ensure proper balancing for a satisfactory exhaust system. Each hood should have a separate and self-supporting system. Air changes in the utensil washroom should be 5 changes per hour for general room exhaust and 30 changes per hour when all systems are operating.  
\*\*\*\*\*

\*\*\*\*\*  
NOTE: Delete types not used in project.  
\*\*\*\*\*

### [2.8.2.1 Hood Over Utensil-Washing Sink, Type 5

Provide a 1980 by 1065 by 450 mm 78 by 42 by 18 inch high hood. Provide condensate collecting gutter and drain to sink drainboard or floor drain. Slope top of hood 150 mm 6 inches down toward front of hood starting 300 mm 12 inches in from back edge. Mount to wall with anchors provided by manufacturer and hang from ceiling with 16 mm 0.625 inch stainless steel rods. Provide an opening in top of hood for exhaust duct. Center opening in top of hood from left to right and front to back. Provide a 50 mm 2 inch high stainless steel duct collar, welded to hood top. Mount at height indicated. Provide controls for fans.

### ] [2.8.2.2 Hood Over Utensil-Washing Machine, Type 6

\*\*\*\*\*  
NOTE: If Type 5 hood is not used, insert salient requirements regarding shape, mounting, and duct connection.  
\*\*\*\*\*

Provide hood of same length and width as utensil washing machine. Provide condensate collecting gutter and drain to [floor drain] [\_\_\_\_\_]. Slope top, mount, and provide duct opening and collar as specified for Type 5 hoods. Mount at height which avoids interference with machine operation. Provide controls for fans.

### ] [2.8.2.3 Exhaust Over Dishwashing Machines, Type 7

Provide two rectangular duct chambers, with connections at each end of dishwashing machine, not less than 150 mm 6 inches deep and extending width of dishwashing machine unless otherwise recommended by dishwashing machine manufacturer. Chambers shall converge over dishwashing machine at a 45 degree angle to form a single outlet to exhaust duct. Provide controls for fans.

### ] 2.8.3 Gutter and Drain

Provide inside bottom perimeter with a 75 mm 3 inch face with a 25 mm 1 inch high flange turned up at a 45 degree angle, to form gutter. Provide a 25 mm 1 inch stainless steel drain in back corner, extending to specified

discharge.

#### 2.8.4 Fan Controls

Provide, for each condensate hood, controls for operating fans. Include manual push buttons labelled "start" and "stop" and labelled light indicating when fans are operating.

##### 2.8.4.1 Hood Exhaust and Supply Fans

\*\*\*\*\*  
NOTE: Exhaust fans for kitchen equipment should be centrifugal type with top discharge, adjustable pulleys, and disconnect switches. Protect motor against vapor-laden air stream.  
\*\*\*\*\*

Provide in accord with Section 15720N AIR HANDLING UNITS.

##### 2.8.4.2 Hood Exhaust and Supply Duct

\*\*\*\*\*  
NOTE: Duct work to kitchen hoods and for dishwashing machines should be carefully incorporated into Section 15810, "Ductwork and Ductwork Accessories" and onto the drawings to assure coordination with kitchen equipment design. The following are necessary:  
  
1. Curbs must conform to NFPA 96.  
  
2. Hood exhaust and supply duct: Minimum 1.2 mm thick 18 gage stainless steel, welded water tight. (Unexposed duct can be galvanized steel). Conform to SMACNA HVAC Duct Const Stds standards.  
\*\*\*\*\*

Provide in accord with Section 15810N DUCTWORK AND DUCTWORK ACCESSORIES.

#### 2.9 GAS BURNERS

Equip burners and pilots located in enclosed compartments with automatic shut off of gas supply, if burners fail to ignite, or pilot is extinguished.

##### 2.10 WATER FILTERS

\*\*\*\*\*  
NOTE: Delete if adequate water softening is provided for the entire facility.  
\*\*\*\*\*

Provide factory installed water filters on equipment connected to building plumbing system and processing water to dispense as food service product.

##### 2.11 PREFABRICATED WALK-IN REFRIGERATORS AND FREEZERS

\*\*\*\*\*  
NOTE: Walk-ins shall be floorless, installed over insulated floors, unless otherwise directed.  
\*\*\*\*\*

Provide insulated floors under each walk-in refrigerator and freezer as if each unit were a freezer. Material for floors and surrounding areas should be quarry tile or other suitable material.

\*\*\*\*\*

Provide walk-in units manufactured for food service use conforming to NSF 7 and UL 471. Floorless, with insulated floor screeds.

#### 2.11.1 Panel Construction

Interchangeable, 1200 mm 4 feet maximum width, 100 mm 4 inch thick, filled with insulation. Provide preformed corner panels extending not less than 300 mm 12 inches in each direction. Panels to have tongue and groove edges or flush joints with double seal serrated neoprene rubber gaskets to assure air and vapor tight joints. [Provide panels for separating sections.]

- a. Insulation: 100 mm 4 inch minimum foamed-in-place polyurethane with manufacturer's rated "K" factor of not more than 0.15, free rise density of not less than 27 kg per cu meter 1.7 pounds per cubic foot, or in-place density of not less than 32 kg per cu meter 2 pounds per cubic foot. Provide floor screeds with minimum of 63 mm 2 1/2 inches of foamed insulation.
- b. Closures: The exposed exterior of the walk-in unit shall be closed to adjacent walls and ceiling with panels of same material as used for exterior of walk-in unit panels.
- c. Finish:
  - (1) Exterior: [Stainless steel on all exposed surfaces and doors, aluminum on unexposed surfaces.] [Aluminum with two coats of white, baked-on enamel paint.]
  - (2) Interior: [Stainless steel] [Aluminum with two coats of white, baked-on enamel paint]. [Glass reinforced fiber panel.]

#### 2.11.2 Doors

Provide [one] [two] per [unit] [section], with 100 mm 4 inch thickness, filled with insulation. Provide vinyl hanging strips, able to be replaced individually and anchored at head. Each door panel shall have an outside pilot light, a light switch and a remote bulb sensor with exterior flush-mounted, waterproof thermometer for registering box inside temperature. Provide anticondensing strip heaters around perimeter of door panel jambs. Top and each side of door shall have a resilient, non-magnetic or thermoplastic with magnetic steel core gasket installed. On bottom edge of door, provide a replaceable, adjustable rubber or vinyl wiper gasket.

- a. Hardware: Provide two self-closing, spring-loaded hinges for each door. Include plated steel pin and cam-lift type bearing. Provide door latch with cylinder lock and with provisions for padlock. Include safety-release handle to permit opening from inside when locked.

#### 2.11.3 Lights

Provide two-tube fluorescent lamps in vapor-proof fixtures with safety

shields. Provide diffuser and ballast capable of operating in minus 23 degrees C 10 degree F temperature. Lights shall run full length of walk-in unit starting 600 mm 2 feet from front panel and extending within 600 mm 2 feet of back panel. Run [between shelf rows] [as indicated].

#### 2.11.4 Pressure Relief Port

Provide pressure relief port [in each section], heated electrically and insulated.

#### 2.11.5 Refrigeration

\*\*\*\*\*  
NOTE: Refrigeration units may be located inside or outside, but if units are to be located outside in a cold climate they should have winter controls, heaters, and enclosed compressor housings.  
\*\*\*\*\*

Conform to ASHRAE 15. Provide pre-assembled remote condensing unit assembly with all necessary components factory-installed and wired including electrical box, time clock, drier, sight glass, [winter control and crankcase heater] [enclosed compressor housing,] and compressor rack. [Set meat chiller to operate at minus one degree C 30 degrees F and other refrigerators to operate at one degree C 33 degrees F; set freezers to operate at minus 18 degrees C 0 degrees F.]

#### 2.11.6 Monitoring System

Provide an electronic monitoring and alarm system for [each section of] each unit. Alarm shall warn of abnormally low and high temperatures.

- a. System components: Detecting thermostat, master control panel, interconnecting wiring, [remote, labeled, and audible alarm,] and defrost compensator. Provide dials showing temperatures and pilot lights, warning lights, switches, transformer, and buzzer, all as a part of the master control panel. Locate master control panel [and remote audible alarm] as indicated. Provide power fuse to protect system components.
- b. System operation: Set alarms at 5 degrees C 10 degrees F above and below specified operating temperatures.

#### 2.11.7 Personnel Alarm

For each unit, provide separate audible alarm system operable from inside unit, for use of personnel unable to exit unit. Locate remote audible alarm where indicated.

#### 2.12 LIST OF EQUIPMENT AND FIXTURES

\*\*\*\*\*  
NOTE: Edit the master equipment schedule carefully; retain items of equipment used for the project. The Equipment List is intended to be edited and included in the project Specification. The information contained herein shall be listed on the Equipment List on the Contract Drawings.  
\*\*\*\*\*

### 2.12.1 Format

Provide the equipment listed except as otherwise specified as a result of the Logistical Class listed. Entries in paragraphs, "Schedule," include the following information, when applicable:

\*\*\*\*\*  
NOTE: The Navy equipment symbols must be used on the drawings in a table keyed to plan location by a secondary designation. The Navy equipment symbols are intended to be used as shown, without renumbering for deleted items or because of added items. Contact NAVFSSO for equipment table format.  
\*\*\*\*\*

- a. Naval Equipment Symbol.
- b. Logistical Classification.
- c. Generic description of equipment.
- d. Referenced applicable document or statement that equipment is Custom Fabricated or of Commercial design.
- e. Classification: Type, Style, Class, Size, Group, Model and Grade for equipment defined by referenced applicable document.
- f. Description for Custom Fabricated and Commercial design, and required features or accessories.
- g. Dimension: listed in order of length, width and height.
- h. Utility Requirements: Electrical: volts, hertz, phase; gas; plumbing: water, drain; steam listed in order.

### 2.12.2 Abbreviations

Abbreviations used in Paragraph, "Schedule," are defined as follows:

AMPS:	Amperes	
J:	Joules	BTU: British Thermal Units
CRS:	Stainless Steel	
CW:	Cold water	
DIA:	Diameter	
DR:	Drain	
FED:	Federal Specification	
G:	Gas	
L:	Liters	GAL: Gallon
W:	Watts	HHP: Horsepower
HW:	Hot water	
mm:	Millimeters	IN: Inches
JSN:	Joint Schedule Numbers	
KW:	Kilowatts	
L:	Left	
kg:	Kilograms	LB: Pounds
LOG CLASS:	Logistical Classification	
MIL:	Military Specification	
MIN:	Minimum	

NSF: National Sanitation Foundation  
R: Right  
STM: Steam  
x: By, in usage describing dimensions of a rectangular solid

#### 2.12.3 Definitions

Terms used in Paragraph, "Schedule", are defined as follows:

- a. Sheet Pan: Standard 450 by 650 by 25 mm 18 by 26 by 1 inch deep pan, unless otherwise noted.
- b. Pan: Standard 300 by 500 by 150 mm 12 by 20 by 6 inch deep pan.
- c. Tray: Cafeteria tray 350 by 450 mm 14 by 18 inch, unless otherwise noted.
- d. 115-60-1: 115-volt, 60-hertz, 1-phase electric service and connection.
- e. 208-60-1: 208-volt, 60-hertz, 1-phase electric service and connection.
- f. 208-60-3: 208-volt, 60-hertz, 3-phase electric service and connection.

#### 2.12.4 Dimensions

Dimensions used in Paragraph, "Schedule," are in millimeters inches, unless otherwise noted. Dimensions are listed in order of length, width, and height, unless otherwise noted. Terms are defined as follows:

- a. Length: Distance across front of equipment
- b. Width: Distance from front edge to back edge
- c. Height: Distance from bottom edge to top of equipment
- d. Depth: Distance from rim to bottom at drain, as in a sink.

#### 2.12.5 Logistical Classification

\*\*\*\*\*  
NOTE: The Logistical Classifications listed in the schedule assume Class A (funded with building project funds and provided by the Contractor) for all building equipment and Class C (funded with other than building project funds and provided by the Government) for all collateral equipment. (The latter are listed because they are connected to building services or otherwise need the Contractor's attention). If equipment is to be procured with any other funding or procurement method, revise the "Log Class" symbol as appropriate. Government-furnished equipment must also be addressed in Section 01110, "Summary of Work."  
\*\*\*\*\*

Method of Procurement listed in Paragraph, "Schedule", is defined as

follows:

- a. Class A: Contractor-furnished and Contractor-installed.
- [b. Class B: Government-furnished and Contractor-installed].
- c. Class C: Government-furnished and Government-installed.
- [d. Class D: Government-furnished as leased equipment and Government-installed.]
- [e. Class E1: Government-furnished and Government-installed.]
- [f. Class E2: Government-furnished and Contractor-installed.]

Equipment designated Logistical Class ["C"] ["D"] ["E1"] will be Government-provided. Equipment which is Government-provided will be furnished and installed by the Government in space made available by the Contractor and with rough-in made by the Contractor in accord with the information made available or referenced herein or indicated.

#### 2.12.6 Schedule

\*\*\*\*\*  
NOTE: Submit the proposed equipment list to the  
Naval Food Service System Office, who will furnish  
Naval Equipment Symbols and Descriptions. Contact  
the NAVFSSO at commercial telephone (202) 433-0716  
or DSN 288-0716.  
\*\*\*\*\*

\*\*\*\*\*  
NOTE: The Logistical Classification of the  
equipment listed at this Technical Note will depend  
on the Classification selected for associated work  
listed elsewhere. Coordination is required.  
\*\*\*\*\*

\*\*\*\*\*  
NOTE: When equipment is added to this schedule, add  
the applicable Standard to paragraph entitled  
"References."  
\*\*\*\*\*

Naval Equipment Symbol	Log Class	Description
KH-60-0		HOOD, CENTRIFUGAL GREASE EXTRACTING EXHAUST
KH-60-1	A	COMMERCIAL; TYPE 1: SERVE OVER SHELF TYPE; AS SPECIFIED IN PARAGRAPH ENTITLED "HOODS"; 208-60-1 AND 115-60-1, HW, DR
KH-60-2	A	COMMERCIAL; TYPE 2: ISLAND TYPE; AS SPECIFIED IN PARAGRAPH "HOODS"; 208-60-1 AND 115-60-1, HW, DR
KH-60-3	A	COMMERCIAL; TYPE 3: WALL MOUNTED FREE STANDING; AS SPECIFIED IN PARAGRAPH "HOODS"; 208-60-1 AND

Naval Equipment <u>Symbol</u>	<u>Log</u> <u>Class</u>	<u>Description</u>
		115-60-1, HW, DR
KH-60-4	A	COMMERCIAL; TYPE 4: LOW CEILING; AS SPECIFIED IN PARAGRAPH "HOODS"; 208-60-1 AND 115-60-1, HW, DR
KH-64-0		HOOD, CONDENSATE EXHAUST
KH-64-5	A	CUSTOM FABRICATED; TYPE 5: OVER UTENSIL-WASHING SINK; AS SPECIFIED IN PARAGRAPH "HOODS"
KH-64-6	A	CUSTOM FABRICATED; TYPE 6: OVER UTENSIL WASHING MACHINE; AS SPECIFIED IN PARAGRAPH "HOODS"; DR
KH-64-7	A	CUSTOM FABRICATED; TYPE 7: OVER DISHWASHING MACHINE; AND AS SPECIFIED IN PARAGRAPH "HOODS"; DR
KR-74-0		REFRIGERATORS AND FREEZERS, PREFABRICATED, WALK-IN
KR-74-4	A	REFRIGERATOR; AS SPECIFIED IN PARAGRAPH, "PREFABRICATED WALK-IN REFRIGERATORS AND FREEZERS"
KR-74-8	A	FREEZER; AS SPECIFIED IN PARAGRAPH, "PREFABRICATED WALK-IN REFRIGERATORS AND FREEZERS"
KS-48-0		SINK, HAND
KS-48-3	A	COMMERCIAL; [____]; AS SPECIFIED IN PARAGRAPH "SINKS"; CW, DW, DR
KS-50-0		SINK, POT WASHING
KS-50-7	A	CUSTOM FABRICATED; AS INDICATED AND SPECIFIED IN PARAGRAPH "SINKS"; CW, HW, DR

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### 3.1.1 General

Install in accord with the manufacturer's printed instructions.

##### 3.1.2 Cutting and Patching of Construction

Lay out work in advance to prevent damage to building, piping, wiring, or equipment as a result of cutting for installation.

##### 3.1.3 Setting and Connecting

Install equipment plumb and level. Except for mobile and adjustable-leg equipment, securely anchor and attach items and accessories to walls, floors, or bases with stainless steel bolts. Flash food service cabinets located in wall openings to the walls with 0.9 mm thick 20 gage stainless steel. Seal around equipment flashing and flanges, at walls, floor, and ceiling in accord with Section 07920 JOINT SEALANTS. Fillers shall be

continuous, without opening.

#### 3.1.4 Welding Field Joints

Weld stainless steel by the electric fusion method. Provide where required by and in accord with paragraph "FABRICATION."

#### 3.1.5 Brazing

Accomplish with silver solder. Use for joining copper tubing to brass and bronze connection fitting and for no other purpose.

#### 3.1.6 Cleaning and Adjusting

Test and adjust equipment for proper operation. Test rotating components and motors for proper rotation. Lubricate moving parts if suggested by manufacturer's literature. Prior to acceptance of project, clean and sanitize equipment both inside and outside.

#### 3.1.7 Installation of Hoods

Install in accord with NFPA 96. Install hoods to remain free from vibration under all conditions of operation.

#### 3.1.8 Floor Screeds

Anchor, install, and seal in accord with the recommendations of the manufacturer of the walk-in unit.

### 3.2 FIELD INSPECTIONS AND TESTS

#### 3.2.1 Inspections

Inspect equipment, fixtures, and material after installation for compliance with the applicable standards.

#### 3.2.2 Tests

Upon completion of inspection perform operational tests on each piece of equipment to determine that equipment and components, including controls, safety devices, and attachments, operate as specified and are properly installed and adjusted. Test all water, drain, gas, steam, oil, refrigerant, and liquid carrying components for leaks. Notify the Contracting Officer 14 calendar days prior to testing.

##### 3.2.2.1 Walk-In [Refrigerator] [and] [Freezer] Test[s]

\*\*\*\*\*

NOTE: This is an operational test for freezer/cooler equipment only. Include only when applicable. Incorporate operational tests for any item specified to assure proper rotation of rotating components, to preclude leakage or excessive noise or vibration of components or parts due to poor workmanship or improper design, to assure proper electrical connection of electrical components, and to assure the equipment will operate without failure through not less than two cycles of operation.

\*\*\*\*\*

Perform an operational test on each unit after installation and adjustment.  
Operate unit long enough at the required control setting to determine that refrigeration, defrost, and control systems operate and cycle properly.

### 3.3 SCHEDULE

Metric measurements in this section are based on mathematical conversion of English unit measurement, and not on metric measurement commonly agreed to by the manufacturers or other parties. The English and metric units for the measurements shown are as follows:

<u>Products</u>	<u>English Units</u>	<u>Metric Units</u>
Stainless steel legs	4 inches	100 mm
Stainless Steel	12 gage	2.5 mm
	14 gage	1.8 mm
	16 gage	1.5 mm
	18 gage	1.2 mm
Channels	one x one inch	25 x 25 mm
	12 gage	2.5 mm
Angles	1 1/2 x 1 1/2 x 1/8 inch	38 x 38 x 3 mm
-- End of Section --		