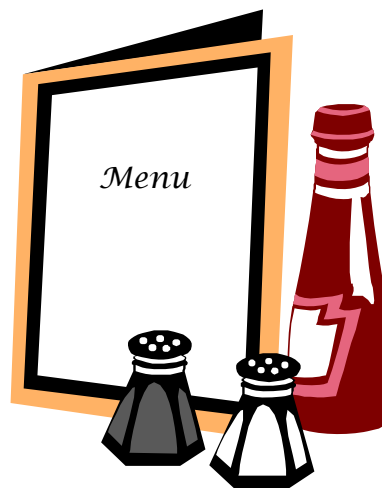


# BOULDER COUNTY PUBLIC HEALTH

## Food Facility Plan Review Packet

Food Service Establishments  
Retail Food Markets



Boulder County Public Health  
Environmental Health Division  
3450 Broadway  
Boulder, CO 80304  
phone: (303) 441-1564  
fax: (303) 441-1468



[www.BoulderCountyFood.org](http://www.BoulderCountyFood.org)



**PUBLIC HEALTH**  
**Environmental Health Division**  
**Food Safety Program**

Dear Applicant:

Colorado Revised Statutes require complete plans and specifications be submitted, reviewed, and approved by Boulder County Public Health (BCPH) before the start of any construction of a retail food establishment in Boulder County. A plan review application fee of \$100.00 is required upon submittal of plans in addition to the \$300.00 fee for plan review activities. **The total fee of \$400.00 is due upon submittal of a plan review application packet.** Plan review activities are charged at an hourly rate, which is subject to change on a yearly basis. Any balance remaining from fees collected, which are not applied to the plan review process will be refunded by mail after the opening inspection.

BCPH's plan review team is committed to providing excellence in technical assistance and customer service. A plan review application and plan review specification form is enclosed. *The Colorado Retail Food Establishment Rules and Regulations* and a *Food Equipment Installation Guide* should be obtained to assist you in determining the requirements for your facility. Both of these documents are available free of charge at the Boulder County Public Health office listed below. To ensure prompt service, all items must be completed in full before the plan review process is initiated. **Failure to provide the required information may delay the plan review process.**

You will receive written notification within 14 working days that your plans are approved or that additional information is required. If additional information is required to complete the plan review, the applicant is responsible for the submittal of additional plans and specifications. Be advised that an, additional 14 working days may be required for the review. Also, if plans are significantly changed after initial approval is received, new plans and additional fees may be required.

Plan review packets, including application fee, can be submitted to the Boulder County Public Health office at:

Boulder County Public Health (BCPH)  
Environmental Health  
3450 Broadway  
Boulder, CO 80304  
(303) 441-1564  
Fax: (303) 441-1468

If you have any questions concerning the above requirements, please feel free to contact this BCPH at (303) 441-1564



**Boulder County Public Health  
PLAN REVIEW APPLICATION**

**NAME OF FACILITY:** \_\_\_\_\_

Address: \_\_\_\_\_ Suite / Unit #: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

**Name of Owner:** \_\_\_\_\_

**NAME UNDER WHICH FOOD LICENSE IS TO BE ISSUED**

(Individual[s] or Corporation Name): \_\_\_\_\_

Address: \_\_\_\_\_ Suite / Unit #: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

**TYPE OF OWNERSHIP:** (as indicated on your Colorado Business/Sales Tax Registration)

- Individual (if sole proprietor, you must complete a Public Benefit Affidavit and provide an approved form of identification)
- General Partnership
- Limited Partnership
- Limited Liability Company
- Limited Liability Partnership
- Limited Liability Limited Partnership
- Corporation
- "S" Corporation
- Association
- Estate
- Government
- Joint Venture
- Trust
- Non-profit 501(c)(3) (please enclose copy of IRS letter of exemption)
- Other Non-profit

**PRINCIPLE CONTACT PERSON:** \_\_\_\_\_

**NAME OF COMPANY** (If Applicable): \_\_\_\_\_

Address: \_\_\_\_\_ Suite / Unit # \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_ Fax: \_\_\_\_\_

**FACILITY STATUS:** Is this a remodel of an existing food facility?    **YES**    **NO**    (Circle one)

If Yes: Name of Previous Establishment: \_\_\_\_\_

If No: Previous Type of Business: \_\_\_\_\_

If this is a facility change of ownership, when did the change of ownership occur? \_\_\_\_\_

**SEATING CAPACITY:** Indoor \_\_\_\_\_ Outdoor \_\_\_\_\_ TOTAL \_\_\_\_\_

**Total Square Footage of Facility:** \_\_\_\_\_ **Sq. Ft.**

**Total Square Footage of Food Preparation and Storage Areas:** \_\_\_\_\_ **Sq. Ft.**

	<b>Breakfast</b>	<b>Lunch</b>	<b>Dinner</b>
<b>Maximum Number of Meals Served:</b>			

**EMPLOYEES:** Maximum Number Per Shift \_\_\_\_\_

**SEASONAL OPERATION:** YES ( ) NO ( )

If yes, dates of operation: \_\_\_\_\_

Days of operation: \_\_\_\_\_

Hours of operation: \_\_\_\_\_

Have plans been submitted to, or do you intend to submit plans to other counties in the state of Colorado?

Yes ( ) No ( )

If Yes, Where? \_\_\_\_\_

- The plan review expires one year from date of approval.
- If construction or remodeling is not started within that time period, it may be necessary for you to resubmit for a new review of plans.
- Any changes or alterations to plans **must** have prior approval by Boulder County Public Health. Significant changes or alterations to plans will require a new plan review and plan review fee.

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE

<b>Public Health Use Only</b>					
Restaurant		Fee 0131		No Fee 0132	SR #
Application Fee		IN #		Receipt #	
Plan Review Fee		IN #		Receipt #	

## Plan Review Checklist

The following items (1-11) must be submitted in order to initiate the plan review process. Check off (✓) items as they are completed. If an item is not applicable to construction, write N/A.

- \_\_\_ 1. Plan Review Application form (pages 3-4).
- \_\_\_ 2. Plan Review Specification form (pages 5-12).
- \_\_\_ 3. Proposed menu or list of foods prepared on the premises.
- \_\_\_ 4. Site plan, including streets, alleys, and entrances.
- \_\_\_ 5. Facility floor plan, to scale, including all equipment and fixtures (see example, Appendix A).
- \_\_\_ 6. Equipment list, including make, model numbers, and installation methods (page 7).
- \_\_\_ 7. Finish schedule detailing proposed materials for all floors, walls, ceilings, counters, shelves, etc. (page 13).
- \_\_\_ 8. Plumbing schedule showing location of all fixtures, floor drains, floor sinks, supply lines, drain lines, and backflow prevention devices.
- \_\_\_ 9. Water heater location, make and model number, capacity, recovery rate at 100° F rise, BTU or KW input, and hot water usage requirements (see Appendix A).
- \_\_\_ 10. Waste disposal methods, including garbage disposal locations, grease interceptor location (if applicable), trash storage and container locations.
- \_\_\_ 11. Ventilation schedule, including exhaust capacity (CFM ratings) of all hoods. Location of all hoods, and detailed shop drawings of all hoods (including length and width). Location of all make-up air registers, including CFM ratings for outside air (see Appendix B).

## NOTICE:

### **INCOMPLETE PLANS WILL DELAY THE PLAN REVIEW PROCESS.**

Onsite wastewater treatment systems and non-community and private water supplies are permitted separately. For further information **contact Boulder County Public Health at 303-441-1190.**

## PLAN REVIEW SPECIFICATION

### I. Menu and Food Handling Procedures:

(Attach additional sheets as needed when listing foods and writing out procedures.)

- A. Submit a menu or list of foods to be served. Plans will not be approved without a menu.
- B. Do you have a Hazard Analysis Critical Control Point (HACCP) Plan or a Food Handling Procedure Manual that describes preparation, cooling, reheating, cooking of foods, and the handling of leftovers?  
( )Yes ( )No If yes, please submit with plans.
- C. List the foods and describe the methods of how hot foods will be cooled to 41°F (5°C) or below.
- D. List the foods and describe the methods of how foods will be rapidly reheated to 165°F (74°C) or above.
- D. List the foods and indicate how hot foods will be held at 135°F (60°C) or above.
- E. List the foods and indicate how cold foods will be held at 41°F (5°C) or below.
- F. How will frozen foods be thawed?
- G. Will raw meats, poultry, and seafood be stored/displayed in the same refrigerator(s) and freezer(s) with cooked, ready-to-eat foods? \_\_\_Yes \_\_\_ No  
If Yes, how will they be stored to prevent cross contamination?
- H. Where will produce be washed?
- I. Will catering be conducted? \_\_\_Yes \_\_\_ No
- J. Will food be transported or delivered to another location? \_\_\_Yes \_\_\_ No  
If yes, what equipment will be provided to maintain food at proper temperatures during transport?
- K. Will vacuum packaging be conducted in the establishment? \_\_\_Yes \_\_\_ No  
If yes, please provide the required HACCP Plan for each category of food to be vacuum packaged.

## II. Facility Floor Plan:

A. Submit the floor plan drawn to scale. The floor plan must include location and identification of **all equipment** and areas including:

1. Sinks -

- a) Lavatory(s) - Number provided, including in restrooms: \_\_\_\_\_
- b) Food preparation sink(s) - Number provided: \_\_\_\_\_
- c) Mop sink(s) - Number provided: \_\_\_\_\_
- d) Dump sink(s) - Number provided: \_\_\_\_\_
- e) Warewashing (three-compartment) sink(s) - Number provided: \_\_\_\_\_

2. Wait station(s) - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

3. Toilet facilities - Required

4. Dry food storage area(s) - Required

5. Employee locker/storage area(s) - Required

6. Chemical storage area(s) - Required

7. Water heater - Required

8. Bar service area(s) - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

9. Indoor and outdoor seating - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

10. Outdoor cooking or bar area(s) - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

11. Laundry facilities - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

12. Recycle/damaged/returned goods location - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

13. Floor sinks and floor drains - Required

14. Grease interceptor or grease trap? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, indicate the location and contact the local wastewater authority for sizing information and any required permits.

15. Ice bins / ice machines - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

16. Dipper wells - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

17. Chemical dispensing units - Provided \_\_\_\_\_ Not Applicable \_\_\_\_\_

**Note:** See Appendix A for example floor plan.



**D.** Submit shop drawings of all custom fabricated equipment and cabinetry, drawn to scale.

**E.** Submit the following warewashing information:

**1.** MANUAL - Include the following for all warewashing sinks: (kitchen, dishroom, bar, etc.)

**a)** Size of each sink compartment in inches:

Length: \_\_\_\_\_ Width: \_\_\_\_\_ Depth: \_\_\_\_\_

Length: \_\_\_\_\_ Width: \_\_\_\_\_ Depth: \_\_\_\_\_

Length: \_\_\_\_\_ Width: \_\_\_\_\_ Depth: \_\_\_\_\_

**b)** Size of all soiled and clean drainboard(s)/drying racks in inches:

Length: \_\_\_\_\_ Width: \_\_\_\_\_

Length: \_\_\_\_\_ Width: \_\_\_\_\_

Length: \_\_\_\_\_ Width: \_\_\_\_\_

**c)** Pre-Rinse / spray hose provided: \_\_\_\_\_ Yes \_\_\_\_\_ No

**2.** MECHANICAL:

**a)** Make and model numbers of warewashing machine(s): \_\_\_\_\_

**b)** Heat or chemical sanitization: \_\_\_\_\_

**c)** Booster heater (if applicable):

1. Make and model number: \_\_\_\_\_

2. Recovery rate, 40°F rise, at sea level: \_\_\_\_\_

3. Distance from the warewashing machine: \_\_\_\_\_

**d)** Manufacturer's hot water requirement (gallons per hour): \_\_\_\_\_

**e)** Size of all drainboards/drying racks (length and width): \_\_\_\_\_

**f)** Pre-rinse / spray hose provided: \_\_\_\_\_ Yes \_\_\_\_\_ No

**g)** Soak sink provided: \_\_\_\_\_ Yes \_\_\_\_\_ No

**F.** Garbage disposal(s): \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, indicate location(s)

**G.** Submit the following water heater information:

**1.** Make: \_\_\_\_\_ Model number: \_\_\_\_\_

**2.** Energy input rating: \_\_\_\_\_ BTU, or \_\_\_\_\_ Kilowatts

**3.** Recovery Rate in gallons per hour, 100°F rise, at sea level: \_\_\_\_\_

**Note:** See Appendix A for worksheet on calculating minimum hot water requirements.

**H.** Refrigeration/freezer capacities - Complete the following table:

TYPE OF UNIT	# OF UNITS PROVIDED	TOTAL CUBIC FEET
Walk-in Refrigeration		
Reach-in Refrigeration		
Walk-in Freezer		
Reach-in Freezer		
Blast Chiller		
Retail Display		

I. Displayed food items: See Appendix I of the Colorado Retail Food Regulations.

1. Bulk food items: \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, submit equipment specifications for food bins, including vendor supplied equipment.

2. Food shields - Submit the type and location (If custom design, please submit shop drawings).

**IV. Premises:**

A. Submit a site plan which includes the following: refuse enclosures, compactors, outside walk-in cooler(s)/freezer(s), location of water supply, sewage disposal system, grease interceptor, alleys, streets, parking, and outside storage areas.

B. Water supply and waste water systems:

1. Water supply:

a) Community/public (name of district): \_\_\_\_\_

b) Non-community/private: \_\_\_\_\_ PWSID #: \_\_\_\_\_

Well: \_\_\_\_\_ Spring: \_\_\_\_\_ Other (Specify): \_\_\_\_\_

Method of disinfection: \_\_\_\_\_

2. Sewage disposal:

a) Municipal/public: \_\_\_\_\_

b) Onsite wastewater system (OWS) permit number: \_\_\_\_\_

C. Exterior doors and windows:

1. Windows - closed, tight-fitting \_\_\_\_\_ screened \_\_\_\_\_ air curtain(s) \_\_\_\_\_

2. Doors - closed, tight-fitting \_\_\_\_\_ screened \_\_\_\_\_ air curtain(s) \_\_\_\_\_

**V. Mechanical, Plumbing, and Electrical Schedules:**

A. Mechanical:

1. Submit a complete ventilation schedule, including exhaust capacities (cubic feet per minute [CFM] ratings) for all hoods and the location and capacity of all make-up air diffusers. See Appendix B for example ventilation schedule.

2. If the ventilation hoods are UL listed for lower air flows, submit the information located on the manufacturer's UL listing card.

3. Include ventilation systems in restrooms.

**B. Electrical:**

1. Submit the location and type of light fixtures throughout the facility, including the fixtures in walk-in refrigeration/freezer units.

2. Submit the type of bulbs and/or shielding for each type of light fixture, where required.

3. Indicate the location of transformers and electrical panels if located in the food preparation/food storage areas.

**C. Plumbing:**

1. Indicate the following equipment are provided with indirect drain connections:

Dishmachine - floor sink

Food preparation sink - floor sink provided \_\_\_\_\_ not applicable\_\_\_\_\_

Three-compartment utensil washing sink - floor sink provided \_\_\_\_\_ not applicable\_\_\_\_\_

Ice machine - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

Ice bin(s) - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

Water heater - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

Refrigeration condensate lines - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

Dipper well(s) - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

Salad bar(s) - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

Steam table(s) - floor sink or floor drain provided \_\_\_\_\_ not applicable\_\_\_\_\_

2. Submit the location of all hose bibs.

3. Submit the number and location of all toilet fixtures (including lavatories, urinals, and water closets). See Appendix C for the minimum toilet facilities required.

4. Submit the location of the grease trap or interceptor.

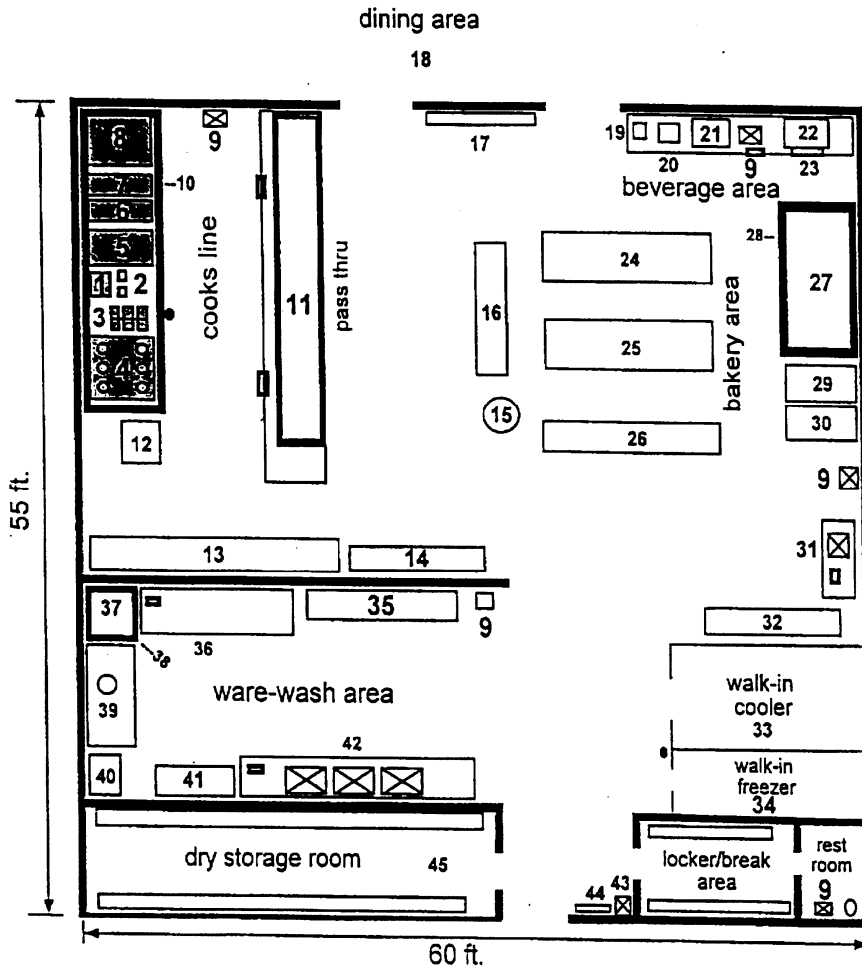
5. Submit the make, model, and location of all chemical dispensing unit(s).

6. Use the following chart to list the location of all backflow prevention devices on potable water connection, including all vendor-supplied items. Any discharge from a backflow prevention device must be indirectly discharged to the sanitary sewer.

<b>EQUIPMENT</b>	<b>INTERNAL PROTECTION</b>	<b>EXTERNAL PROTECTION</b>
Warewashing Machine		
Water Wash Hoods		
Chemical Injection Towers		
Soda Stations		
Coffee Urns		
Ice Makers		
Dipper Wells		
Commercial Disposal With Pre-rinse		
Tea Dispenser		
Mop Sink		
Hose Bib(s)		
Reel Lines		
Steam Kettle Faucets		



# EXAMPLE FACILITY FLOOR PLAN



## Equipment (make and model #)

- |   |  |   |
|---|--|---|
| 1. Cheese melter (ABC #123)   | 16. Shelving unit                              | 32. Stainless prep table                              |
| 2. Microwave (XYZ #34)  | 17. Bread shelving racks                       | 33. Walk-in cooler (COLD #AZ1)                        |
| 3. Steamtable (HOT #A1)   | 18. Dining area                                | 34. Walk-in freezer (COLD #AZ3)                       |
| 4. Stove (AOK #22)  | 19. Coffee maker (ABC #16)                     | 35. Drying shelf                                      |
| 5. Griddle (AOK #Q17)   | 20. Tea maker (ABC #87)                        | 36. Clean drainboard                                  |
| 6. Fryer (ABC #55)  | 21. Soda machine (PDQ #2A)                     | 37. Dishmachine (Magic #15)                           |
| 7. Fryer (ABC #55)  | 22. Espresso machine (ABC #5)                  | 38. Hood, type II (Ezair #17)                         |
| 8. Charbroiler (HOT #A7)  | 23. Undercounter refrigeration unit (COLD #A3) | 39. Dirty drainboard w/ sprayhose, & garbage disposal |
| 9. Hand sink  | 24. Bakers table                               | 40. Dirty dish rack                                   |
| 10. Hood, type I (Ezair #99)  | 25. Bakers table                               | 41. Drying shelf                                      |
| 11. Refrigerator/freezer make-table unit with pass-thru and shelf. (Cold #10) | 26. Shelving unit                              | 42. 3-comp. sink w/ 36" drainboards                   |
| 12. Stainless steel table   | 27. Bake oven (JAM #33)                        | 43. Mop sink  |
| 13. Sliding 3 door refrigeration unit (Cold #12)                              | 28. Hood, type II (Ezair #35)                  | 44. Chemical storage shelf                            |
| 14. Shelving unit   | 29. Proof cabinet (ABC #T2)                    | 45. Shelving  |
| 15. Mixer (XYZ #q23)  | 30. Proof cabinet (ABC #T2)                    | Floor sink  |
|   | 31. Vegetable prep sink & 18" drainboard       | Floor drain   |



## APPENDIX C

### MINIMUM PLUMBING FACILITIES

Restaurants, Pubs, Lounges  
Fixtures per Person

Total seating capacity: \_\_\_\_\_ Total employees per shift: \_\_\_\_\_

Establishments with a total seating capacity of 15 or less may have a unisex restroom with minimum fixture requirements: 1 toilet and 1 hand sink.

Establishments with seating capacity or employees per shift of greater than 15 are required to have two restrooms. To find minimum fixture requirements, define the male/female ratio:

EXAMPLE:

Total Seating Capacity  
100  
Divide By  
2

Ratio Males to Females  
50 →

→ Females =

Fixture Requirements:

<b>1 Sink</b>	<b>1 Toilet</b>
---------------	-----------------

50 → Males =

<b>1 Sink</b>	<b>1 Toilet</b>	<b>1 Urinal</b>
---------------	-----------------	-----------------

For 50 males and 50 females:

- Women's restroom: one sink and one toilet
- Men's restroom: one sink, one toilet and one urinal

<b>TOILET: Men/Women</b>		<b>HAND SINK: Men/Women</b>	
Capacity		URINAL	Capacity
<b>1 – 50</b>	<b>1</b>	<b>1 per 150 Men</b>	<b>1 – 150</b>
<b>51 – 150</b>	<b>2</b>		<b>151 – 200</b>
<b>151 – 300</b>	<b>3</b>		<b>201 – 400</b>
<b>Over 300</b>	<b>1 additional for every 200 persons</b>		<b>Over 400</b>
			<b>1 additional for every 400 persons</b>

Establishments other than restaurants, pubs, and lounges may vary in fixture requirements. Refer to 2000 Uniform Plumbing Code (UPC) or contact this department for assistance.

## APPENDIX D

### WORKSHEET FOR CALCULATING MINIMUM HOT WATER REQUIREMENTS

The following worksheet is provided to assist operators in calculating hot water usage and sizing of the water heater required for the operation.

#### CALCULATE WATER REQUIRED BY ALL FIXTURES:

##### A. Three compartment sink calculation of water usage:

1. Measure dimensions of each compartment, if compartments are not the same dimensions, see note below.

Length= \_\_\_\_\_ Width= \_\_\_\_\_ Depth= \_\_\_\_\_

2. Insert measurements into equation

$$\left( \frac{\text{Length}}{\text{Length}} \times \frac{\text{Width}}{\text{Width}} \times \frac{\text{Depth}}{\text{Depth}} \times 3 \times .375 \right) \div 231 = \frac{\text{Water Usage}}{\text{Water Usage}}$$

Note: If all the compartment sizes of the sink are not the same, then 3 is taken out of the equation, and the above calculation is done for each compartment. The volumes are added to obtain the total gallons per hour of hot water used in the sink.

**Enter number into attached Table to Calculate Total Water Required By All Fixtures.**

##### B. Utensil soak sink

1. Measure dimensions of sink

Length = \_\_\_\_\_ Width = \_\_\_\_\_ Depth = \_\_\_\_\_

2. Insert measurements into equation

$$\left( \frac{\text{Length}}{\text{Length}} \times \frac{\text{Width}}{\text{Width}} \times \frac{\text{Depth}}{\text{Depth}} \times .375 \right) \div 231 = \frac{\text{Water Usage}}{\text{Water Usage}}$$

**Enter number into attached Table to Calculate Total Water Required By All Fixtures.**

##### C. Dishmachine and conveyor pre-rinse water usage:

Use manufacturer's rating in gallons per hour

**Enter number into attached Table to Calculate Total Water Required By All Fixtures.**

##### D. Clothes washer water usage:

Use manufacturer's rating, or 32 GPH for 9-12 pound washer, or 42 GPH for 16 pound washer.

**Enter number into attached Table to Calculate Total Water Required By All Fixtures.**

**E. Go to the Table on the next page and enter water usage totals into the appropriate rows and columns.**

**TABLE TO CALCULATE TOTAL WATER REQUIRED BY ALL FIXTURES**

Plumbing Fixture	Water Usage (gallons per hour)	Number of fixtures	Maximum hourly water usage per type of fixture (gallons per hour)
<i>Example: dishmachine</i>	<i>50</i>	<i>1</i>	<i>50</i>
<i>Example: handsinks</i>	<i>5</i>	<i>4</i>	<i>(5 x 4) = 20</i>
3-compartment sink			
3-compartment sink (bar)			
Utensils soak sink			
Dishmachine			
Dishmachine conveyor pre-rinse			
Clothes washer			
Hand operated pre-rinse sprayer	32		
Handsinks (including restrooms)	5		
Mop sink	7		
Garbage can washer	35		
Employee showers	14		
Hose bib used for cleaning	35		
<b><u>Total water (gph) required by all fixtures</u></b>			

**A. Working across each row, use the gallon per hour (gph) rating for each type of fixture, and the number of fixtures in the operation, into the Table above to calculate “Maximum Hourly Usage” for each type of fixture. (see example at top of table)**

**B. Then, working down the right column, add up the “Maximum Hourly Usage” for each type of fixture to calculate “Total Water Required By All Fixtures” in the operation.**

**C. Take the “Total Water Required By All Fixtures” Total, and enter that number into the following equations for either a Gas Water Heater or Electric Water Heater to determine the rating of the water heater required.**

## CALCULATE THE WATER HEATER SIZING REQUIREMENTS:

### A. GAS WATER HEATER:

1. To calculate the maximum hourly hot water usage for the facility, first adjust the total water required by all fixtures, for the altitude of the facility. The altitude adjustment is 4% per 1000 feet of elevation, or 20% at 5000 feet.

$$(.04 \times \frac{\text{elevation of facility}}{\div 1000}) + 1 = \frac{\text{adjustment factor}}{\text{adjustment factor}}$$

2. Using the adjustment factor from above, calculate the hourly hot water usage.

$$\frac{\text{adjustment factor}}{\text{adjustment factor}} \times \frac{\text{total water required by all fixtures}}{\text{total water required by all fixtures}} = \frac{\text{maximum hourly hot water usage}}{\text{maximum hourly hot water usage}}$$

\*For example, if the elevation of a facility is 5000 feet, the adjustment factor would be 1.2.

If the total water required by all fixtures (gph from the previous table), is 100 gph, then the maximum hourly hot water usage would be 120. Therefore, a water heater with 120 gph recovery rate would be required for the facility.

3. Use the “maximum hourly hot water usage” value in the previous equation to calculate the minimum BTU rating of the water heater using the calculation below.

**Commercial water heaters only-** Insert the decimal equivalent of the water heater thermal efficiency rating in the box below. (if unknown or a non-commercial water heater, use .75)

$$\left( \frac{\text{maximum hourly usage as calculated above}}{\text{maximum hourly usage as calculated above}} \times 100 \times 8.33 \right) \div \boxed{\phantom{000}} = \frac{\text{minimum BTU rating}}{\text{minimum BTU rating}}$$

### B. ELECTRIC WATER HEATER:

1. If an electric water heater is to be used, the maximum hourly hot water usage for the operation is the same number as the total gph of water required by all fixtures as calculated in the Table in section 2.

**Use this value in the equation to calculate the minimum Kilowatt rating of the water heater.**

$$\left( \frac{\text{maximum hourly hot water usage (as totaled in the Table, section 2)}}{\text{maximum hourly hot water usage (as totaled in the Table, section 2)}} \times 100 \times 8.33 \right) \div 3412 = \frac{\text{minimum Kilowatt rating}}{\text{minimum Kilowatt rating}}$$

**4. SELECT WATER HEATER BASED UPON BTU OR KILOWATT RATING:**

**Make:** \_\_\_\_\_ **Model:** \_\_\_\_\_

**BTU Rating:** \_\_\_\_\_

or

**Kilowatt Rating:** \_\_\_\_\_

**Recovery Rate:** \_\_\_\_\_ gallons per hour at 100° rise at sea level

**The BTU or Kilowatt rating for the water heater in the facility must be equal to or greater than the minimum BTU or Kilowatt rating calculated in sections 3-A or 3-B.**