

NATURAL GAS FOODSERVICE EQUIPMENT **CLEANING & MAINTAINING USER'S GUIDE**



A  Sempra Energy utility®



USER'S GUIDE TO CLEANING AND MAINTAINING NATURAL GAS FOODSERVICE EQUIPMENT

The energy and equipment experts at the SoCalGas® Food Service Equipment Center have published this reference guide to provide important information for keeping your restaurant equipment clean and energy-efficient. This complimentary handbook is one more way SoCalGas is furthering its commitment to building the cleanest, safest, and most innovative energy company in America.

NOTATION

This guide provides an overview to assist you in cleaning and maintaining your natural gas-fired equipment. The information is presented for informational purposes only. The guide is not guaranteed or warranted to provide solutions to any specific situations. Although SoCalGas has used reasonable effort to assure the accuracy of the information at the time of its inclusion, no express or implied representation is made that it is free from error or suitable for any particular use or purpose. SoCalGas assumes no responsibility for any use thereof by you.

Individual equipment manufacturers provide specific cleaning and maintenance recommendations to ensure safe and efficient use of their equipment. This guide is not intended to be and should not replace the manufacturer's instructions. To the extent that there is any inconsistency or conflict between this guide and the manufacturer's recommendation, you should always follow the manufacturer's recommendation.

Also, always consult with a qualified professional for guidance or assistance if you are unsure about performing any of the cleaning and maintenance of your equipment.

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FOOD SERVICE EQUIPMENT CENTER*

SoCalGas® Energy Resource Center & Food Service Equipment Center

9240 Firestone Blvd.
Downey, CA 90241

The Food Service Equipment Center, located at the Energy Resource Center in Downey, California, is a state-of-the-art kitchen and a great resource for any commercial foodservice customer. The center is the largest test kitchen for natural gas-fired equipment in the country. You can attend seminars, learn about energy-efficient equipment and which equipment qualifies for a rebate.

TRY BEFORE YOU BUY

SoCalGas offers a state-of-the-art Commercial Kitchen as well as a Ventilation and Bake Lab equipped with five different ventilation hoods and industry-standard bakery ovens. Bring your own recipes and ingredients to assess cooking quality, production, ease of operation and maintenance. Test out new features, compare operating costs and discover rebates on new energy-efficient, high-performance equipment. Test and compare more than 150

pieces of natural gas equipment from more than 50 manufacturers. As a brand neutral facility, we can help you understand the difference between available models.

To make an appointment, call **(562) 803-7323** or email ercfoodsvc@socalgas.com

EDUCATIONAL SEMINARS & WEBINARS

Attend our no-cost monthly seminars and webinars on a wide variety of topics including food safety, kitchen ventilation, trends, equipment maintenance, kitchen remodels, sustainability for foodservice, and more.

Learn more and register at seminars.socalgas.com

EQUIPMENT REBATES

SoCalGas offers rebates on newly purchased select natural gas-fired foodservice equipment that replace inefficient equipment. Rebates can help offset the purchase price of newer, high-efficiency models. Your operation can benefit from continued savings through lower operating costs year after year.

*The SoCalGas Energy Resource Center and Food Service Equipment Center are temporarily closed due to the COVID-19 pandemic. All equipment demonstrations, in-person educational seminars, and tours are suspended until further notice.

GENERAL ADVICE

FOODSERVICE EQUIPMENT SERVICES

At no additional charge, SoCalGas offers equipment services, maintenance advice and low cost parts for all types of natural gas commercial equipment.

CALL 1-800-GAS-2000 to schedule an appointment with a commercial service professional.

SAVE TIME...SAVE ENERGY...SAVE MONEY

Simple routine maintenance and cleaning of your commercial natural gas-fired equipment is straightforward and could save downtime and money spent on service calls. Most problems associated with commercial foodservice equipment can be attributed to two fundamental facts:

- 1 The natural tendency toward standard wear and tear.** A comprehensive equipment-specific maintenance schedule can help keep equipment performing as it should through the rigors of daily use.
- 2 Ineffective staff training on equipment operation and maintenance.** A thorough staff training and re-training program focused on proper operations and regular equipment maintenance can help prolong the operational life of equipment.

NATURAL GAS SUPPLY

Although the natural gas supply to commercial cooking equipment is not usually a maintenance issue, there are considerations to keep in mind. If additional natural gas equipment is added to a supply source, it is important to verify that there will be adequate natural gas supply when each piece of equipment is on high-fire (maximum input) simultaneously. Also, it is important to be sure the external equipment regulator, if equipped, is located where it will not be subjected to excessive temperatures and the vent area is clean and open. These conditions can affect the natural gas supply pressure to the burners as well as the cooking process. With equipment that is capable of extremely high temperatures (griddles, broilers, salamanders and others), the regulator location is important. Excessive heat can damage the regulator diaphragm and adversely affect operation of the equipment.



INTRODUCTION

Maintenance: The process of preserving; preventing failure. Maximizing reliability and performance to the extent possible.

There is never a convenient time for your primary equipment to fail and stop producing your signature food product. Today's commercial kitchens have little redundancy in foodservice equipment – if your core menu item is flame-broiled burgers and your broiler fails, you risk temporary closure, your business' reputation, your profits and you could end up with an unplanned service bill.

Equipment failure typically occurs during peak production and during after-hour service periods. Repair rates during these times can be double that of scheduled service during non-peak periods. Thus, a preventative maintenance program can be a time and cost-saving program for your operation. Building a preventative maintenance program around your core equipment is paramount to your kitchen's continued success.



EXAMPLE**

Say you have a boiler-based steamer to prepare all the side dishes on your menu, but your operation does not have a preventative maintenance program in place – your supply water does not meet the manufacturer's warranty requirements and you decided not to purchase the recommended descale chemicals. In this scenario, you may have saved the half hour of labor for your regular nightly cleaner to descale the boiler and the \$50 expense on the gallon of descale chemicals. Now, your steamer cooking cycle is taking longer than usual, and your final food product temperature is not being achieved in the normal cooking time. No problem: simply increase the cooking time. Your restaurant's speed of service will only take a marginal hit. Two weeks later, the steamer no longer produces steam! It is Friday night and now you have no vegetables or rice for dinner service. The steamer boiler tank has built up so much scale that the elements have failed. You call for service – the service professional (on overtime) shows up and you learn that your only option is a complete boiler tank replacement. This \$10K piece of equipment will need over \$5K of service and be out of commission for 1 to 2 weeks. The manufacturer's warranty clearly states maintenance and water quality requirements, so this service will not be covered. Routine preventative maintenance for the steamer could have avoided such a devastating scenario for your operation.

**All cost estimates based on 2020 research of leading commercial foodservice equipment and supplies online retailers and repair/service groups.



Restaurants simply cannot budget for emergency service calls, so preventing equipment failure in the first place should be the foundation of any well-run restaurant operation. In this example, the operations manager could have instituted a steamer checklist with a line item to regularly descale the steamer's boiler. With this box checked, an unexpected \$5K bill could be averted.

A sound maintenance program not only aims to prevent equipment failure but also promotes safer working conditions for your staff. Commercial kitchen equipment can be dangerous if not properly maintained. Effective operational programs should also account for cleaning and organizational protocols to help protect your staff and your business from a worst-case scenario.

Many restaurant concepts revolve around a few specialty menu items. First, identify the three menu items that are your top sellers:

- Which equipment pieces are required to produce these items?
- What is the risk that they will fail?

Now take a deeper look to determine the most common components that could cause your menu-critical equipment to fail or become a safety hazard. Start a service log or refer to your service agent's records to determine which components fail most often and why.

- Is there a plan to maintain or get the manufacturer's design life out of the each of these components?
- What can you do to train your managers and staff to keep your "tools of the trade" functioning?
- Are there general guidelines that apply to any type of equipment?
- Should you invest in backup parts to have on hand for critical times of failure?

This guide will cover these questions and more.

**Be proactive.
An effective maintenance
program includes planning
and risk management.**

Well-maintained kitchen equipment is the key to product consistency and stable food production.

A customer may be ordering your signature food item for the first time – you must serve that product with the same consistency that has made your concept a food destination. It is tough to survive, let alone stand out in a crowded foodservice industry with thousands of concepts and specialty food experiences all competing for diners' loyalty. The last thing you need is for a core equipment piece to fail when you need it most. A preventative maintenance plan tailored to your equipment lineup should be as important to your operation as sourcing your ingredients, preparing your food, or servicing your customers.


The goal of this guide is to prevent any costly unplanned downtime and maintain maximum life expectancy from your foodservice equipment.

How to Read this Guide

Safety Warnings will appear in red and detail certain safety precautions that should be followed when maintaining, servicing and/or operating a piece of equipment.

Essential Maintenance Supplies for each equipment type are listed in gray. These are the minimum recommended tools and components to effectively clean and maintain your equipment.

Required Regular Maintenance items for each equipment type are listed in blue. These are the minimum recommended maintenance items to serve as a foundation to effectively maintain your foodservice equipment. However, maintenance items can vary widely by manufacturer and model type; be sure to check your manufacturer's literature to ensure you are following the correct procedures for your equipment.

Maintenance items that are recommended to be performed by a qualified professional will have a  icon next to them. For these items, please consult your manufacturer or local authorized service agent.



EQUIPMENT CLEANING & MAINTENANCE WORKSHEET

Use the following worksheet to customize this guide to your specific operation. Enter your three primary pieces of equipment, locate the corresponding section in the guide and fill in the supplies and maintenance items required for proper maintenance.

EQUIPMENT #1:

SUPPLIES:	<input type="checkbox"/>
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PRIMARY MAINTENANCE ITEMS:	<input type="checkbox"/> DAILY:
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EQUIPMENT #2:

SUPPLIES:	<input type="checkbox"/>
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EQUIPMENT #3:

SUPPLIES:	<input type="checkbox"/>
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	<input type="checkbox"/> MONTHLY:
	<input type="checkbox"/> QUARTERLY:
	<input type="checkbox"/> SEMI-ANNUALLY/ANNUALLY:

GENERAL MAINTENANCE

The following general guidelines are foundational to a successful preventative maintenance program and the equipment-specific content in this guide. These ten tips can be applied to any piece of equipment in your commercial kitchen and are a good starting point when first assessing your operation's cleaning and maintenance needs:

TOP TEN TIPS

1. Read the operation manual. Complete the warranty and registration on new equipment.
2. Train staff on proper equipment operation and maintenance.
3. Inspect equipment regularly.
4. Communicate potential problems as soon as possible.
5. Replace broken or worn-out parts immediately.
6. Be cautious of "Do it Yourself" fixes. Call a qualified professional for service.
7. Clean and sanitize equipment regularly.
8. Follow cleaning procedures and chemical recommendations provided by the manufacturer.
9. Use water filtration systems when recommended (if applicable).
10. Utilize the proper cleaning tools and materials for the job.

For each equipment maintenance task to follow, this guide offers frequency suggestions (daily, weekly, etc.), as a basis for building a generic maintenance schedule. However, your operation may require more or less frequent adherence to these schedules depending on your hours of operation, cooking volume, menu items and other factors specific to your operation.



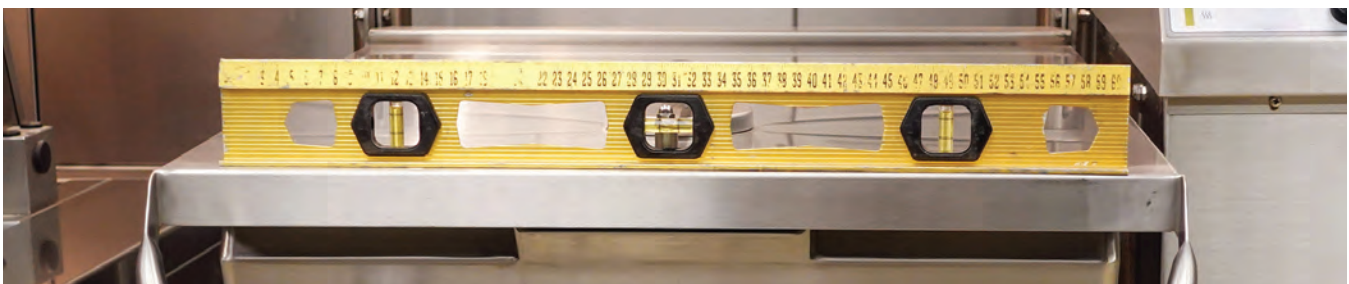
EQUIPMENT INSTALLATION & STARTUP

Preventative maintenance starts when first installing the equipment in your kitchen. Install equipment on a natural gas line with a dedicated shut-off valve (right) and properly installed quick disconnect device (i.e., not hard plumbed) (shown below). Train your staff to correctly shut off the natural gas and disconnect the natural gas line. This will help the regular maintenance and cleaning of your equipment and the removal of grease and debris buildup in the areas between and behind them. Cooking equipment on casters will also help with cleaning and maintenance.

Safety Warning: It is required to install a restraining device no longer than the gas connector on all equipment with casters and/or a quick disconnect device. Consult manufacturer-specific recommendations based on equipment type.

Once the equipment is installed or moved to a new location in your kitchen, pay special attention to any gas odors that can indicate a leak. Immediately call a qualified professional or SoCalGas. Throughout day-to-day operations, ensure staff can recognize and report natural gas odors immediately in case of leaks.

Be sure to level your equipment front-to-back and side-to-side before first use or after the equipment has been moved to a different location. Leveling can be achieved on most equipment by placing a level on its surface (below) and adjusting the levelers typically found on the legs. Leveling is especially important for equipment such as griddles, braising pans, steamers and ovens. When equipment is not set to level, it can adversely affect the even cooking of food products and may lead to a localized buildup or residue or other operational issues.



DAILY OPERATIONAL TIPS

- ☐ Do not set the thermostat higher than the food product requires.
- ☐ Most cooking equipment needs only 10-15 minutes to preheat; turn on equipment just before cooking.
- ☐ Cook with full loads of food product whenever possible.
- ☐ Turn controls down or off during off-peak hours.
- ☐ Regularly clean front, sides and controls of equipment with a damp cloth. Shine with stainless steel cleaner.
- ☐ Continuously keep the equipment workstation clean by removing any clutter or grease.
- ☐ Clean all spills immediately.
- ☐ Use lids on foods, where applicable, to maintain food temperatures, increase yield and increase efficiency.



NATURAL GAS BURNER BASICS

A critical component of natural gas-fired equipment is the stability of the burner flame. Several factors can affect flame stability – primary fresh air, burning speed, port size and depth of the port. Flames stabilize at the point where the flow of natural gas equals the burning speed – this balance explains why flame characteristics can change whenever the primary air or natural gas input is adjusted.

The following terms will be referenced throughout this guide and should be clearly understood by operators planning a maintenance schedule for their natural gas equipment:

Air-to-Gas Ratio: The ratio of the air supply flow rate to the natural gas supply.

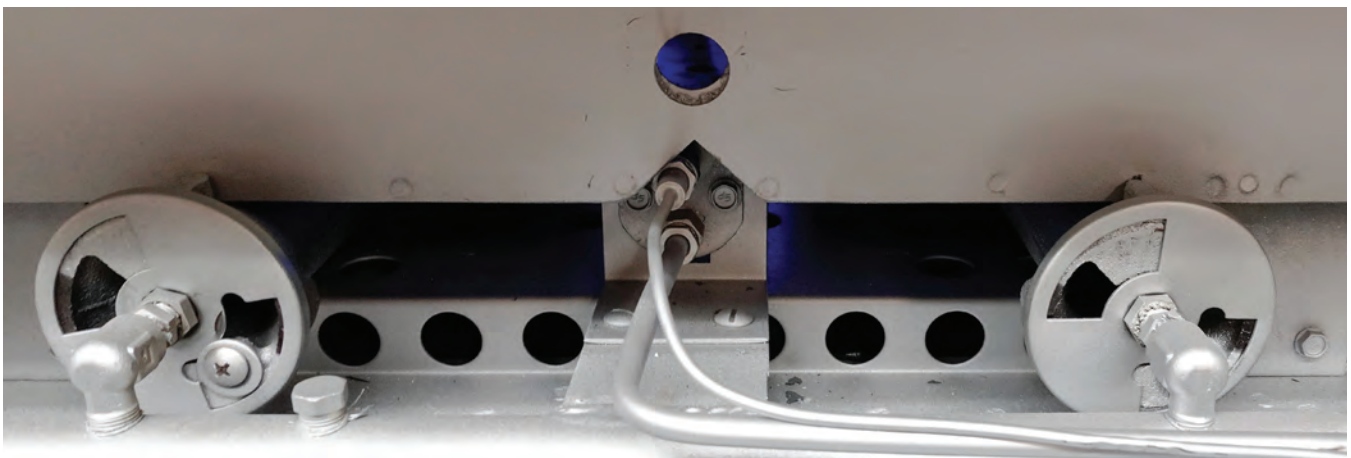
Air Shutter: An adjustable shutter on the primary air opening of a burner that is used to control the amount of air introduced into the burner body. The photo below depicts an air shutter on a deck oven burner.

Atmospheric Burner: A device that produces a controlled flame by mixing natural gas with air allowing for ignition and combustion.

Burner Port: Any opening in a burner head through which the air-gas mixture is discharged.

Orifice: An opening that allows the discharge of natural gas into the burner.

Pilot: A small flame that is used to ignite a burner.



Power Burner: A burner that uses forced air with a mechanical blower to mix with greater amounts of natural gas while maintaining the required air-to-gas ratio.

Primary Air: The air introduced into a burner that mixes with the natural gas before it reaches the port.

Pressure Regulator: A device for controlling and maintaining a uniform natural gas pressure.

Secondary Air: Externally-supplied air to a burner flame at the point of combustion.

At least once a month, check the natural gas flame pattern in the burner and pilot systems as a part of your maintenance schedule. Ideal flame characteristics include a completely blue flame, distinct individual flame patterns and uniform flame heights (top right).

INCORRECT BURNER FLAME PATTERNS

Safety Warning: If you notice any of the following flame patterns upon inspection, contact a qualified professional as soon as possible.

1. YELLOW FLAME

Take care to distinguish yellow tips (center right) from red or orange streaks, which are produced from dust or other impurities being consumed in the flame and do not require adjustment. Yellow-tipped flames indicate incomplete combustion and will produce soot. On open burners, the cooking pan's exterior will accumulate soot and be difficult to clean. On a hot top, soot acts as an insulator and slows heat transfer. If allowed to accumulate, the soot blocks the natural venting process required to maintain complete combustion.

2. BLOWING OR LIFTING FLAMES

When blowing flames occur (bottom right and top of pg. 11), part of the flame lifts or "dances" on the burner port. This may occur on a few or all ports of a burner. The flame cannot stabilize at the burner port as in normal operation. If the flames lift from several ports, they may create a distinct "flame" blowing noise. A more serious condition, incomplete combustion, will occur when there is a distortion of the flame pattern.

3. FLASHBACK

Flashback occurs when the air/natural gas mixture ignites inside the burner to burn near the orifice. This burning in the mixer tube usually creates a roaring noise like a blowtorch. Any flashback condition is dangerous and a qualified professional should be contacted immediately.



BLUE FLAME



YELLOW FLAME



BLOWING FLAMES



The burning action inside the mixer tube does not get enough air and combustion is incomplete, producing odors and soot, which clog the inside of the burner. A common occurrence with a commercial range top burner is the build-up of excessive grease or debris inside the burner that can slow the air/natural gas mixture down and cause flashback to occur.

4. FLUCTUATING FLAMES

This condition usually indicates inconsistent natural gas pressure. Lengths of the burner flame may increase and decrease (fluctuate) over a short period of time with no burner readjustment. Burner flame lifting may also be associated with flame fluctuation. Fluctuating flames do not usually create any immediate problems, such as incomplete combustion, unless the flame impinges on a cool surface. This condition should be corrected.

5. SMOTHERING FLAMES

Smothering occurs most often in an enclosed area such as the burner compartment of an oven or burners under a hot top. Smothering flames are “lazy” looking. The flame does not display well-defined cones and appears to be “reaching” for the air. They are quiet flames, which roll around in the combustion chamber, sometimes completely off the burner ports. The difference between smothering flames and lifting/blowing flames should be clearly understood. Blowing or lifting flames are well-defined and may create a blowing noise. Smothering flames indicate incomplete combustion. They point to a dangerous condition that requires prompt action by a qualified service technician or SoCalGas.

6. FLAME ROLLOUT OR DELAYED IGNITION

Flame rolls out of the combustion chamber or burner area when the burner is turned on. Flame rollout may create a fire hazard and will scorch equipment finishes, burn wiring and damage controls. The natural gas in the burner mixer may be ignited, producing flashback.

CONTROLS

Train staff to recognize and report malfunctioning, broken or melted control knobs as soon as possible so they can be repaired, replaced or investigated for contributing factors. If the equipment has smart controls, make sure staff is trained on their proper use and can recognize if they become faulty or require a software update. If control valves become difficult to turn, like on broilers or ranges, consult a qualified professional to lubricate or replace the valves. Generally, avoid getting water, grease or cleaning solutions in or on equipment controls and electrical components.

For equipment with accessible control panels, like fryers, routinely check for damaged wiring (particularly where the insulation has broken) and repair/replace if necessary. Make sure to unplug or disconnect from power before performing any wiring work. Tighten or replace loose terminals and clean any corrosion found on the electrical connections in the control system.

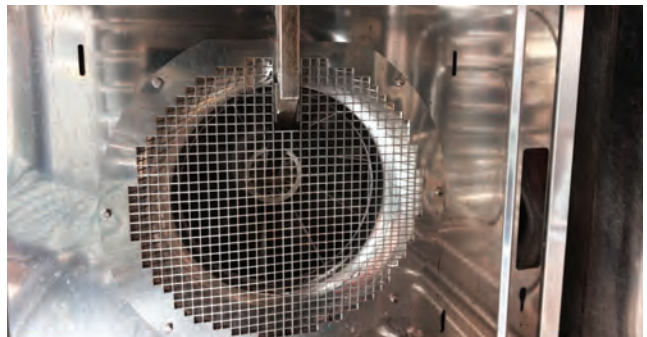
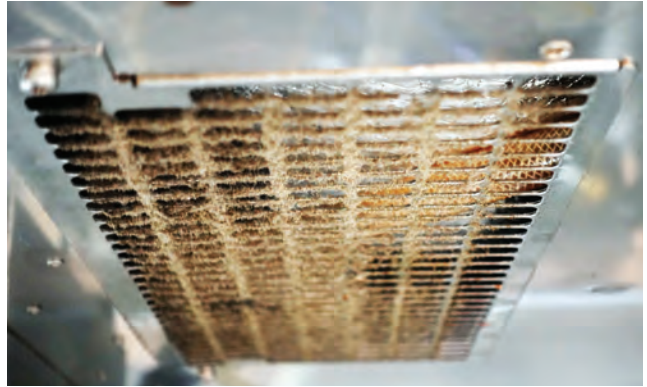


EXTERNAL AIR OPENINGS, FANS AND MOTORS

Many types of cooking equipment, like ovens and underfired broilers, need to have air inlets (louvers, cutouts, etc.) checked and cleaned periodically to remove dust and particles that can collect and obstruct airflow, negatively impacting equipment performance. Some equipment with air vents located in the back may need casters to help ease regular maintenance and access to open panels.

Fan wheels on foodservice equipment (e.g., convection ovens, equipment with power burner systems, etc.) also need to be inspected and cleaned regularly to prevent buildup of debris (dust, flour, food particles, aluminum foil, etc.) on the fan blades. Bakeries should institute more frequent cleanings of fan wheels and blades due to the substantial amount of flour used in these operations that can quickly build up in fans and external air openings.

Air openings on motors also need to be kept clean and clear. Motors need adequate airflow to dissipate the heat generated by the motor itself and the heat conducted from the cooking area. Failure to keep air openings clear will cause the motor to run hot and eventually overheat. This is extremely important to the longevity of the motor. Also, motor mounting hardware can loosen over time and cause misalignment - occasionally check that the motor is securely mounted in the correct position. Many motors have sealed bearings that otherwise require no additional maintenance.



WATER QUALITY

Operators should be aware of their incoming water quality as it can affect the functionality and longevity of water-using equipment like steamers, combination ovens, and dishwashing machines. Water is distilled when it is converted to steam and any solids that were suspended in the water will remain in the equipment. Almost all water contains dissolved solids and corrosive compounds. Referred to as "limescale" or simply "lime" or "scale", these mineral deposits will insulate boiler tubes, foul controls and clog pipes and valves. As such, it is highly recommended to send a water sample to a lab for analysis or have a water quality expert analyze your local water supply. The results of water analysis will indicate whether adding filtration or water softening will help to increase the life of your equipment.

Supplying treated or conditioned water (e.g., reverse osmosis water filtration system, pictured to the right) to these pieces of equipment is highly recommended and in many cases, may be required to meet the water quality standards as specified by the manufacturer. Check your owner's manual for water supply specifications and plan to descale your water-using equipment on a regular basis. The frequency of descaling your equipment will vary depending on use and the hardness of your water supply, but this guide will provide general frequency requirements based on equipment type. Heavy scale buildup in your equipment should be descaled by a qualified service professional.



GRIDDLES

PRIMARY MAINTENANCE ITEMS

Griddles are comprised of a large, smooth or grooved plate heated by burners underneath. The primary maintenance items for griddles include the cooking surface, grease pan, knobs/controls, and burners.

Essential Maintenance Supplies:

- ☐ Scraper(s), spatula(s), high-temperature squeegee(s)
- ☐ Sponge and cloth
- ☐ Small bottle brush (for burner cleaning)
- ☐ Manufacturer-recommended cleaning agents

Scratches and nicks can cause carbon build-up on the griddle plate when it is idle and make food stick. Check spatulas and scrapers for sharp edges or rough areas and replace as needed. Avoid use of griddle stones, steel wool, wire brushes, and/or heavy metal scrubbers on stainless steel, plate steel, chrome, or any polished cooking surface.

Required Regular Maintenance:

- ☐ **Daily:** Scrape cooking surface between food items.
- ☐ **Daily:** Thoroughly clean the grease pan.
- ☐ **Monthly:** Check cooking surface for cracks; Check splashguards for seam separations.
- ☐ **Monthly:** Inspect and clean burners and pilots.

During the inspection of the burner compartment, clean any built-up dust and lint with a soft bottlebrush, check the burners for signs of warping, and ensure a blue flame. Look for any grease that has solidified into amber or dark brown hanging residue (like icicles), which can be further confirmation of a surface crack or seam separation.

Safety Warning: These substances can be a fire hazard - contact a qualified professional to remove and correct the source problem as soon as possible.

ENERGY EFFICIENCY TIP

Idle energy consumption can be substantial for griddles. Turn off the griddle when not in use. For griddles with multiple sections, turn off unused sections during off-peak periods. When idle, lower double-sided griddle tops to the down position to improve heat retention and energy efficiency.



CLEANING TIPS

Clean the griddle surface while warm (at the manufacturer-recommended temperature) using a spatula, griddle scraper, or high-temperature squeegee. Rinse and wipe away any residue with a mixture of hot water and an approved cleaning agent.

After cleaning, it is best practice to season the griddle plate:

- ☐ Preheat the griddle to 400°F.
- ☐ Coat the surface with a light, even layer of cooking oil or pan spray.
- ☐ Let the oil sit on the surface for approximately two minutes.
- ☐ Carefully wipe off any excess oil with a dry cloth.
- ☐ Repeat as many times as necessary to attain a shiny surface.
- ☐ When finished, wipe off all excess oil and turn off the griddle.

Safety Warning: Never use cold water or ice on a hot griddle plate.



TILTED BRAISING PANS

PRIMARY MAINTENANCE ITEMS

Tilted braising pans, or “tilt skillets”, are high-capacity pans with a tilting mechanism to aid in distributing large quantities of cooked food and separating out liquids. Many of the maintenance items for griddles also apply to braising pans. In addition to maintaining the cooking surface and burners, braising pans also have the tilting mechanism as a primary maintenance consideration.

Safety Warning: Do not use a braising pan to deep fry products.

Essential Maintenance Supplies:

- ☐ Non-metal brush, sponge, plastic spatula and/or rubber scraper
- ☐ Commercial-grade soap cleaning agent
- ☐ Foodservice equipment descaling solution

Care should be taken to avoid scratching or nicking the pan's finish; scratches could harbor bacteria growth. Like a griddle, the braising pan's surface can be damaged by sharp edges of spatulas and other utensils. Heavy metal scrubbers, wire brushes and steel wool pads should also be avoided when cleaning.

Required Regular Maintenance:

- ☐ **Weekly:** Thoroughly clean the pan.
- ☐ **Monthly:** Check for lime and scale from hard water. Descale to remove, if necessary.
- ☐ **Monthly:** Inspect and clean burners and pilots.
- ☐ **As needed:** Grease the tilting mechanism.

ENERGY EFFICIENCY TIP

Whenever possible, close the braising pan lid to improve heat retention and energy efficiency. If using the braising pan primarily as a skillet, turn off the equipment during off-peak periods.

CLEANING TIPS

Be sure to regularly clean and rinse the pan's pouring lips and under the pan cover. If food is stuck to the surface of a braising pan, soak and use a little heat to loosen the food. Spray cooking surface with pan coating after cleaning. Take care when sanitizing with a chlorine product: do not allow the chlorine to stay in contact with the stainless steel for more than 10 minutes as longer contact can cause corrosion.



FRYERS

PRIMARY MAINTENANCE ITEMS

Deep-fat fryers can be the most grease-laden and potentially dangerous equipment in your kitchen. Fryers pose a substantial fire and injury (slips, burns, etc.) risk. As a result, maintenance should be a daily scheduled task for your operation.

Maintaining a clean fryer workstation, clear of combustible materials or other items that could fall into the fryer vat or ignite inside the fryer cabinet, should be the primary maintenance item. Other important maintenance items include the oil, the burners/pilots and the fryer vat.

Safety Warning: Serious injury could result from direct contact with hot surfaces and/or oil. Always wear manufacturer-recommended protective supplies like an apron, heat-resistant gloves for skin protection and goggles for eye protection when filtering or cleaning a fryer.

Essential Maintenance Supplies:

- ☐ Long-handled, soft-bristled brush & small bottle brush
- ☐ Metal skimming tool
- ☐ Fryer lid
- ☐ Mechanical filter paper, filter pot, or built-in filtration system
- ☐ Manufacturer-recommended cleaning agent, degreaser and chemical carbon cleaning agent

Required Regular Maintenance:

- ☐ **Daily:** Remove grease accumulation on and around the fryer.
- ☐ **Daily:** Drain and filter oil.
- ☐ **Weekly:** Change oil.
- ☐ **Monthly:** Boil out fryer vat.
- ☐ **Monthly:** Inspect and clean burners, pilots, and gas valve.
- ☒ **Semi-Annually:** Check the high limit switch.

A buildup of sediment and food particles in cooking oil can negatively impact the performance of the fryer, affecting food taste and texture and increasing energy consumption. Instead of frequently purchasing new replacement oil, filter your oil daily to increase its longevity and save on oil costs. Be sure to shut down the



fryer completely and allow the oil to cool before draining and filtering. Consider fryers with a built-in filtration system to allow filtering while the oil is hot, ease the cleaning required, and reduce the risk of injuries when filtering oil manually. To further extend the oil's life, train staff to skim out as much sediment and floating particles as possible with a metal skimming tool throughout the service day. Also, avoid exposing oil to salt, water, excessive heat and chemicals, as they make oil break down faster.


Safety Warning: After filtering or cleaning, be sure all drain valves are completely closed before refilling fryer with oil.

BEFORE




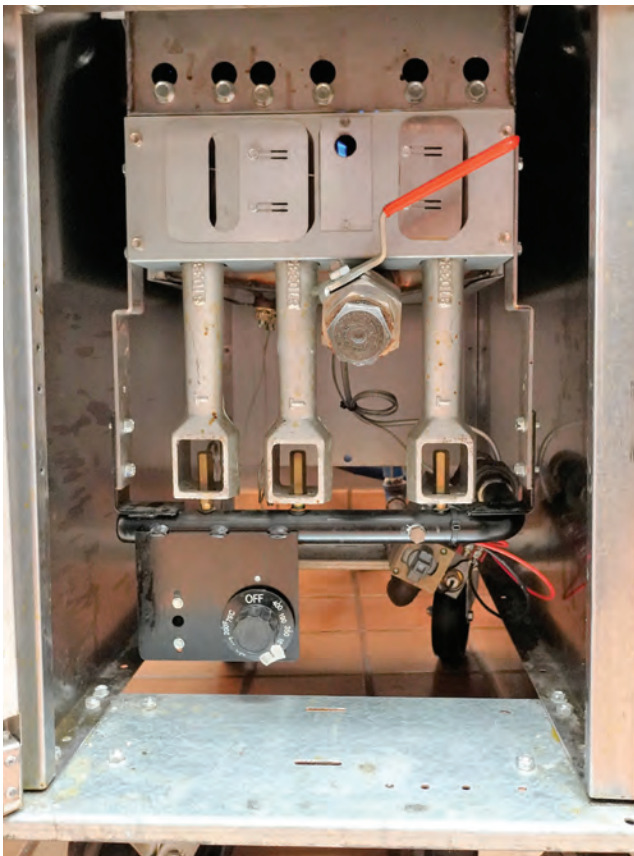
AFTER



 For fryers with atmospheric port-type burners, inspect and clean primary air openings with a soft bottlebrush to remove lint or other particle buildup every month. For fryers equipped with a power burner system, clean and replace paper air filters regularly. For those systems without an air filter, brush clean the screened area located on the blower where the air enters. Inspect the baffles/radiants on fryers with immersion tubes by looking down the burner tubes when the burner is on. The radiants should be concentric and appear evenly heated with the reddish orange color uniformly distributed on the surface of the radiant. Contact your service professional if the radiants appear deformed or deteriorated.

Safety Warning: Keep a Class K fire extinguisher readily available near your fryer workstation.

 Clean the vent area on the gas valve pressure regulator monthly with a dry cloth. Remove and clean the vent plug button (it is a friction fit plug that requires no tools for removal). Replace the vent plug button, if needed. Call a professional to service or replace the control valve if the control knob breaks or cannot be turned by hand. The fryer high limit switch prevents overheating of the cooking oil. Have a qualified professional check the high limit switch every six months or as needed to ensure that it is operational.



ENERGY EFFICIENCY TIP

Cover the fryer vat with a lid when not in use to increase the longevity of the fryer oil, which in turn increases energy performance and saves on oil costs. Limit a fryer's preheat time to 10 or 15 minutes and never longer than necessary. Avoid frying at temperatures higher than necessary - most foods can be fried at 325°F to 350°F. Turn the fryer down or off during down periods or between meal services.

CLEANING TIPS

Clean the fryer vat weekly, monthly, or as needed (depending on volume and type of food products) to remove carbon build-up and prevent vat weakening and leakage. The most common method to clean the vat is the "Boil Out" method, detailed below. Before attempting this cleaning method, check your manufacturer's directions for your specific model and design:

- ☐ Turn off the fryer and let cool. Oil should be no warmer than 170°F before draining.
- ☐ Empty the oil from the tank into a storage container.
- ☐ Remove loose debris from the fryer vat and drain with skimmer and brush.
- ☐ Fill vat with water, add fryer boil-out, and bring to a boil for one hour while hard brushing the surfaces to loosen carbon.
- ☐ Let the water cool and drain.
- ☐ Rinse the vat to clear loose debris and any residual soap cleaning agent.
- ☐ Allow the vat to dry before adding new cooking oil.

Ensure any leftover moisture and chemicals from cleaning is removed before re-adding oil. Take care not to damage the sensing elements when cleaning the fry vat. If the thermostat or high-limit control operates erratically or fails, then you likely have damaged sensing elements and replacement is necessary.

Safety Warning: Do not fire burners with an empty vat; this can cause the seam welds to fail.

Wash fry baskets and fryer utensils in a dishmachine or sink and allow to dry completely before returning to the fry vat. Alternatively, scrub debris off fryer baskets and utensils and put them back in the fryer to be cleaned using the boil-out method above.

Safety Warning: Never add wet items to hot oil.

STEAM JACKETED KETTLES

PRIMARY MAINTENANCE ITEMS

Steam kettles use a “jacket” of hot, pressurized steam around the outside of the vessel to quickly and evenly heat large quantities of chilis, soups, sauces, and other food products. Steam-jacketed kettles require water and pressure to transfer heat to the kettle, which is in direct contact with the food. This means the water quality, pressure related components, and the vessel walls are the primary maintenance items.

Essential Maintenance Supplies:

- ☐ Manufacturer’s recommended water treatment product and pH strips
- ☐ Spare pressure relief valve
- ☐ Foodservice equipment descaling solution

Required Regular Maintenance:

- ☐ **Daily:** Check for proper water level inside the jacket.
- ☒ **As needed:** Bleed air from the kettle jacket.
- ☒ **Monthly:** Test the pressure relief safety valve.

There are two types of steam jacketed kettles - self-contained “direct-fired” kettles and “indirect-fired” kettles that are powered from a central steam system. Each type has different maintenance requirements.

Self-contained, direct-fired kettles need to be checked every day for air and water. The kettle will only function efficiently and safely when the jacket is fully saturated with steam. Air that leaks into the jacket must be bled off to ensure proper operation. When the kettle is cold, the pressure gauge should read below zero, which indicates that the jacket is at a negative pressure or vacuum. A positive reading or a reading near zero indicates that there is air in the jacket. Another indicator of air in the jacket is a discharge from the safety valve as the kettle is heating up.

- ☒ To remove air from the jacket, allow the kettle to heat, making sure there is water or some other liquid in the vessel. When the pressure gauge shows a positive pressure reading of 3 to 5 psi, bleed off the excess air by opening the safety valve for a second or two, then releasing it and allowing it to snap shut.

This step can be repeated until there is only a steam discharge. It is best if the discharge opening of the safety valve is piped or pointed away from the valve.



Safety Warning: Steam is invisible and can cause serious burns; wear safety goggles and protect exposed skin when opening the safety valve. Operators may want to consider a kettle jacket shield as additional safety accessory - these shields rest on the rim of the kettle as a layer of insulation and protection for the operator.

- ☒ In rare cases over time, water will need to be added to the jacket due to steam losses from air bleed off or safety valve checks. The water level must be checked every day before turning the kettle on to verify the level is between the minimum and maximum markers on the sight glass gauge. The water that fills the jacket during manufacturing is treated to protect the metal surfaces from damage and prevent the formation of scale. Each manufacturer recommends a specific product for treating the replacement water. The water must be tested to ensure that the pH level meets the recommendations found in the operation manual before it is added to the jacket. Follow the manufacturer’s specific instructions on adding the water to the jacket, being careful not to introduce air into the jacket during the process. Call a qualified professional if you are unsure about this process.

Safety Warning: Make sure the kettle is fully cooled and shows a negative pressure on the pressure gauge (pg. 18, bottom left) before opening the valve to add water.

Indirect-fired kettles have steam supplied from a remote boiler or central steam system and therefore do not require routine maintenance related to air in the jacket or jacket water levels. However, central steam systems do have other steam-delivery components that need quarterly inspection including the steam pressure-reducing valve, the steam piping, and the condensate piping. Check the valves, traps, and piping for leaks, corrosion, and obstructions and repair as needed.

The two most important components on both direct-fired and indirect-fired kettles are the pressure gauge (bottom left) and the safety valve (bottom right). Failure of either of these components can lead to serious equipment failure and potential injury. Test the safety valve at least once a month by opening it for a second or two while the kettle is at operating temperature, then releasing it and allowing it to snap shut. If the valve leaks, sticks, shows signs of corrosion, is blocked with debris, or doesn't snap back properly, then shut the kettle down and replace promptly. If your kitchen operation relies on the kettle as a core food production component, then it may be wise to keep a spare safety valve on hand as a quick replacement part.

Check the pressure gauge daily to make sure the pressure is in the safe range and that the gauge is functioning properly. If the gauge is sticking, corroded, or reads a pressure higher than the rating of the kettle, shut the unit down immediately and call a qualified professional for service.



ENERGY EFFICIENCY TIP

Most steam-jacketed kettles have the option to use a lid while heating and cooking food. Using the lid can increase the efficiency of the cooking process by 15-20%, reducing your energy cost, shortening cook times, and increasing your food production. For direct-connected steam kettles, clean and maintain the boiler to maintain performance and conserve energy.

CLEANING TIPS

Because food cooked in the kettle is in direct contact with the kettle walls, thoroughly clean and sanitize the vessel before and after every use. During cleaning, protect the vessel walls and avoid scratches or dents; always use a sponge, cloth, or plastic brush and avoid rigid or sharp items like metal spatulas, heavy metal scrubbers, wire brushes, or steel wool pads. After cleaning, allow the kettle to air dry and wipe away any visible water spots with a soft rag and cleaning vinegar.

Using a descaling solution suitable for cooking equipment to remove mineral deposits or film caused by hard water should only be used by manufacturer's direction.

Safety Warning: A descaling solution not suited for cooking equipment could etch the surface, reduce the integrity of the vessel walls, and render the kettle unusable.



STEAMERS

PRIMARY MAINTENANCE ITEMS

Steamers use steam heat in a closed compartment to cook food products. Commercial steamers vary by steam generation method, which can be boiler-based, connectionless (boilerless), or direct steam (remote-supplied steam). Steamers' primary maintenance concerns are door gaskets and water quality.

Safety Warning: Open the steamer door slowly to let hot steam safely escape into the ventilation hood and avoid burns.

Essential Maintenance Supplies:

- ☐ Non-metal sponge, cloth, or plastic brush
- ☐ Replacement door gasket
- ☐ Replacement hand-hole cover gasket (applicable to boiler-based steamers)
- ☐ Foodservice equipment descaling solution

Required Regular Maintenance:

- ☐ **Daily:** Wipe down steamer compartment to remove debris.
- ☐ **Weekly:** Descale compartment drain.
- ☐ **Weekly:** Check door gasket and reverse, if applicable. Replace if worn.
- ☐ **Monthly:** Inspect boiler orifices for scale buildup.
- ☐ **Monthly:** Inspect and clean burners/pilots.
- ☒ **Quarterly or Semi-Annually:** Descale the boiler (if applicable).

For small, dedicated boilers that are part of the steamer unit: Boiler-based steamers have small boilers built into their designs that constantly generate steam for the cooking chamber. These steamer types require regular descaling. The time interval to inspect and descale the boiler will depend on the hours of operation, water quality, and how frequently the boiler is drained or blown down. The time between services may vary from three to six months. At a minimum, it is recommended that descaling service be performed twice a year where reasonable water conditions are found. Refer to the **General Maintenance** section for more information on water quality.

Inspections and descaling should be performed by a qualified professional. Inspections consist of draining the

boiler, removing the hand-hole cover, and inspecting the interior surfaces of the boiler. A build-up of 1/100th of an inch, about the thickness of a business card, means the boiler should be descaled. Remove all loose lime and scale deposits before beginning the descaling process. After the process is complete, a new gasket must be installed for the hand-hole cover. After this service, run the steamer through several cycles to remove any residue from the treatment process. Each manufacturer provides specific recommendations for treating and descaling their boilers.

Safety Warning: Do not mix descaling agents (acid) with degreasing agents (alkali) anywhere in the steamer unit.

For connectionless (or boilerless) steamers: Instead of a dedicated boiler connected to the water supply, connectionless steamers (below) have a heated reservoir at the bottom of the compartment that is filled with water to generate steam. Without a dedicated boiler, regular descaling is not a primary maintenance concern. Typically, connectionless steamers only require a weekly cleaning of the steamer compartment with a mild detergent and occasional descaling of the compartment drain.

For steamers that are supplied steam from a remote location: At least every two months (more often when subjected to heavy use), check the draw-off faucets, valves, and piping for leaks. Check the steam pressure-reducing valve to ensure it is in good condition and functioning properly. Check the steam and condensate piping, the valves, and the traps for leaks and obstructions. Repairs should be done as soon as possible when dealing with pressurized steam.





ENERGY EFFICIENCY TIP

Steamers are water intensive – as water use increases, the energy needed to heat that water also increases. Regularly inspect the steamer for steam or water leaks – leaks can increase operating costs and prevent the steamer from optimal performance. For operations with low-to-moderate steamer use, consider an ENERGY STAR®-rated connectionless steamer, which uses a fraction of the water of boiler-based steamers. For high-volume operations with all-day steamer production, consider an ENERGY STAR®-rated boiler-based steamer that uses much less water and energy than traditional models and will require less frequent descaling. Furthermore, the use of a water treatment system is highly recommended to minimize scaling.

CLEANING TIPS

Open the steamer door and allow the compartment to cool. Clean the steamer compartment by scraping or wiping out any food residue using a sponge, cloth, or plastic brush. Make sure compartment drain holes are clear of any debris. Clean the front and sides of the steamer with a damp cloth. Never hose or steam-clean any part of the steamer. When the steamer is not in use, leave the door(s) open and resting on the latches.

Do not use abrasive or chlorine-based cleaners when cleaning; only use mild detergents. Do not use steel wool or other metal implements to clean inside the steamer compartment – these could scratch surfaces and increase potential bacteria growth.

OVENS

Ovens are a broad category of commercial kitchen equipment and available in many different designs based on the operation type and food product. Generally, most ovens have burners that provide direct or indirect heat to a “hot box” enclosure. The most common ovens in commercial kitchens are range ovens and standalone convection ovens. Most commercial ranges come equipped with a conventional or convection oven below the cooktop. Conventional oven designs are simple – the cooking cavity is heated by burners. Range or standalone convection ovens come equipped with additional fan(s) to circulate hot air inside the cavity for faster, more even heating and browning.

This section will discuss maintenance items for conventional, convection ovens, and most other ovens before exploring targeted maintenance requirements for specialized oven types.



OVENS: GENERAL

PRIMARY MAINTENANCE ITEMS

The primary maintenance items for most commercial ovens are the door(s), cooking cavity, and fans (if applicable).

Safety Warning: Always use hot pads or mitts when removing hot food pans or oven racks from ovens.

Essential Maintenance Supplies:

- ☐ Sponge, cloth, plastic brush, and/or non-abrasive nylon cleaning mesh
- ☐ Commercial-grade oven cleaning solution
- ☐ Replacement door gaskets
- ☐ Water filter components (where applicable)
- ☐ Manufacturer equipment-specific cleaner (combis)

Required Regular Maintenance:

- ☐ **Daily:** Verify hot air is not escaping from the oven door seals; tighten hinges or replace gaskets if necessary.
- ☐ **Daily:** Wipe out food debris from the cooking cavity and clean oven racks.
- ☐ **Weekly** or **Monthly:** Remove fan baffle plate (below) for cleaning. Remove food debris, foil, and flour/dust from blades with a stiff brush.
- ☐ **Monthly:** Verify accuracy of timer and thermostat. If out of calibration, call a qualified professional to repair or replace.

- ☒ **Monthly:** Inspect and clean burners/pilots.

ENERGY EFFICIENCY TIP

Keep the oven doors shut for the cooking duration. Minimize frequent door openings to avoid improper cooking and save on energy. Fill the oven to capacity, but do not overload; overfilling the oven cavity can cause uneven baking.



CLEANING TIPS

Clean the oven cavity regularly:

- ☐ Turn off oven and let cool completely.
- ☐ Remove oven racks and rack supports (if applicable) as the chrome finish can be ruined by oven cleaning solutions.
- ☐ Avoid getting cleaning agents on the temperature sensor/thermostat in the oven chamber.
- ☐ Wipe inside the oven and the crevices around the oven door with water and an approved cleaning agent or detergent solution. Rinse with a damp cloth. Use a non-abrasive nylon cleaning mesh for stubborn spills or stains.
- ☐ For ovens with non-stick **Porcelain Enamel** interiors (the most common), avoid the use of abrasive cleaning materials that can scratch or chip the coating and leave the exposed metal underneath susceptible to rust and food deposits that could harbor bacteria growth.
- ☐ For ovens with **Stainless-Steel** interiors, remove spills and food debris as soon as possible as these finishes are *not* non-stick. Ovens with stainless-steel finishes have corners that can harbor food and bacteria - clean the corners often to prevent buildup.
- ☐ Clean the interior light(s) with a damp cloth.
- ☐ Occasionally remove the fan baffle plate (left) and use a stiff brush on each blade. Replace fan baffle plate when finished.
- ☐ Wipe down oven racks with a damp cloth and replace.

DECK OVENS

Deck ovens are cooking chambers where food is placed in direct contact with the oven floor or “deck”. The oven deck is typically composed of ceramic stone or composite firebrick materials that provide even heat distribution. In addition to the general oven maintenance items, deck oven maintenance should focus on keeping the oven deck free of food debris.

Additional Regular Maintenance:

- ☐ **Daily:** Clean all spills immediately.
- ☐ **Daily:** When stone deck is cool, sweep out crumbs with a cloth or deck brush.
- ☐ **Weekly:** Perform a thorough cleaning of the oven deck - turn up the heat to carbonize stubborn clumps and stains, let cool and remove with a brush.

Do not use any water or other liquid to clean the surface of your stone, which could cause the stone to crack under high heat.

Safety Warning: Do not use oven cleaner or degreaser on stone decks; cleaning agents can be transferred to foods that are cooked on the deck.



CONVEYOR OVENS

Conveyor ovens feature a conveyor belt that moves food through a cooking cavity from one open end (loading) to the other (exiting).

Unlike other ovens, conveyor ovens use high-velocity heated air for cooking (referred to as “impingement”), generated by a power burner. The large volume of hot air is forced through “air fingers”; rectangular tubes with ports facing the conveyor belt.

A few conveyor oven models feature a batch or “indexing” mode in which doors on each end of the cavity close and the belt turns off during cooking; doors then re-open and the belt re-engages for the next batch of food products. This feature is designed to prevent further heat loss through the cavity openings.

Conveyor ovens contain many removable parts that need to be cleaned on a daily or weekly basis. These parts include the conveyor belt, crumb trays, draft diverters, and the air fingers, among others.

Check your manufacturer’s literature for cleaning instructions specific to your model.



Additional Regular Maintenance:

- ☐ **Daily:** Inspect conveyor belts for bent belt wire.
- ☐ **Monthly:** Inspect and clean power burner blower fan wheel.
- ☐ **Quarterly:** Adjust conveyor belt drive and gears for proper tension. Belts will stretch over time.
- ☐ **Quarterly:** Inspect and lubricate bearings per manufacturer’s guidelines.

RACK OVENS

Rack ovens use a mechanism inside the cooking cavity to rotate a rack of pans for even heat distribution over food products. Rack ovens use a combination of dry convection heat and steam injection. Maintenance for rack ovens is similar to convection ovens with the added items of the rotating rack mechanism and water inlet/drain. Bakeries should take extra care to ensure flour does not build up in motor air openings, burner/pilot systems, and fans.

Rack ovens come equipped with a steam injection system where inlet water is instantaneously converted to steam upon contact with superheated heavy metal; the resulting steam is then injected into the cavity. The design of these systems decreases the chance of failure due to scale buildup. However, it is recommended to inspect the steam system, spray nozzles, and drain pan quarterly and descale if necessary, as scale can act as insulation and reduce steam performance.

Additional Regular Maintenance:

- ☐ **Weekly:** Clean flour and dust that may have accumulated on top of the oven and the circulation blower motor.
- ☐ **Weekly:** Check for water connection leaks and ensure the drain line is properly placed.
- ☐ **Monthly:** Clean built-in hood filters with water and an approved cleaning agent.
- ☐ **Monthly:** Tighten hardware on rack lifting/rotating mechanism.
- ☒ **Quarterly:** Inspect and clean power burner fans.
- ☒ **Quarterly:** Inspect and descale steam system trough, spray nozzles, and drain pan.



COMBINATION OVENS

Commonly referred to as “combis”, these ovens combine convective dry heat and steam cooking technologies.

Combis are prized for their versatility in the kitchen, offering multiple cooking methods (roasting, steaming, braising, baking, poaching, rethermalizing, and many more) to the operator in one piece of equipment. These ovens utilize high-efficiency power burners to maintain precise set temperatures with fully adjustable humidity settings. Combi oven cavities are designed with a tight seal to withstand the pressure resulting from steam cooking.

Boiler-based combi ovens come equipped with a separate, steam-generating boiler tank that will require regular descaling depending on your cooking volume and the quality of your water supply (refer to both the **General Maintenance** and **Steamer** sections of this guide for more on water quality and descaling). Many manufacturers require an additional water filtration system on the water supply to the combi oven. Check your manufacturer's specification sheet for water requirements.



Boilerless combis use a steam injection system like that of rack ovens in which inlet water is instantaneously vaporized upon contact with hot heating elements and injected into the cavity.

Most combination ovens feature advanced smart controls (right) for time and temperature monitoring and programmable cooking processes and recipes. Some models have cloud connectivity capabilities. Many combi ovens feature an automatic cleaning mode with manufacturer-specified cleaning chemicals. Depending on use, train staff to engage this cleaning mode after hours as recommended.

Additional Regular Maintenance:

- ☐ **Daily:** Wipe down glass door and gaskets (below).
- ☐ **Weekly:** Check the door gasket and replace if worn.
- ☐ **Monthly:** Inspect water filters and replace as necessary.
- ☐ **Monthly:** Inspect the drain line for buildup or blockage.
- ☐ **Monthly:** Inspect the water orifices for scale buildup.
- ☒ **Quarterly or Semi-Annually:** Descale the boiler (if applicable).



RANGES: OPEN TOP AND HOT TOP

PRIMARY MAINTENANCE ITEMS

The “tried and true” natural gas burners on range tops are the workhorses of most commercial kitchens. The primary maintenance items for open and hot top ranges are the gas flames and residue buildup. Unlike other equipment, range tops require daily cleaning for their continued operation. Refer to the **General Maintenance** section of this guide for more information on common problems related to burner flames.

Essential Maintenance Supplies:

- ☐ Absorbent cloth
- ☐ Scraper and spatula
- ☐ Wire brush
- ☐ Commercial grade cleaning agent
- ☐ Spare knobs

Do not use caustic or abrasive cleaners. Do not use steel wool or scouring pads. Replace broken or missing knobs so that staff can effectively control the flames and energy use of the burners.

Safety Warning: Use caution when setting items on or close to a range. Paper or cloth items can ignite. Also, take care that flammable sleeves and aprons do not contact hot areas when reaching across range tops.

Required Regular Maintenance:

- ☐ **Hourly** or **Daily:** Promptly remove all crumbs, grease, and other spills to prevent burning-on and bacteria growth. Pay special attention to acidic foods.
- ☐ **Daily:** Verify that the flame is blue and not lifting or blowing from the burner ports. Burner flame tips should barely touch the bottom of the pans for open top burners.
- ☐ **Daily:** Empty the grease or crumb tray, clean, and replace.
- ☐ **Daily:** Remove, clean, and replace all rings, plates, grates, and burners.
- ☐ **Daily:** Clean burner ports with a brush, stiff wire, or manufacturer-specified tool, when needed.
- ☐ **Daily:** Check for broken or missing knobs and replace with spares.



Safety Warning: Make sure that all pilot lights are working and properly adjusted. Missing or non-functional pilot lights can create a hazardous situation where bulk natural gas from the burner head escapes into the space without ignition.

After cleaning hot top rings/plates, rub unpainted parts with a cloth dampened with cooking oil. While the surface is slightly warm, clean it gently with a wire brush.

ENERGY EFFICIENCY TIP

Use appropriately sized pots and pans based on burner size (i.e., do not use a small pan on a large burner). For open top burners, consider fin-bottomed pots and pans (below) for improved heat transfer and faster heat up times. This cookware is equipped with a heat sink at its base, which can save on energy costs. For hot tops, increase the energy efficiency by using flat-bottomed pots and pans for maximum surface contact.



BROILERS: UNDERFIRED AND OVERFIRED

PRIMARY MAINTENANCE ITEMS

Broilers are grills that impart smoky, char-grilled flavor and grill marks on a variety of proteins and vegetables. Underfired broilers, or “char-broilers”, radiate heat upward to the cooking grates from briquettes/lava rocks or ceramic, cast iron (top right), or stainless-steel bars (called “radiants”) located directly over the burner tubes. Other broiler models feature infrared (IR) technology with superheated tiles or plates that emit infrared heat toward the cooking grates. Often found in steakhouses and hotels, overfired broilers (bottom right) radiate heat downward toward the cooking grates, which can be raised, lowered, or slid in and out to control temperature and cooking time. Most overfired broilers are equipped with infrared burners.

The primary maintenance items for overfired and underfired broilers include the cooking grates, the radiants, and the burners.

Safety Warning: Wear heat-resistant gloves when operating a broiler.

Essential Maintenance Supplies:

- ☐ Long-handled wire brush
- ☐ Manufacturer-recommended cleaning agent
- ☐ Spare radiants, briquettes, lava rocks (where applicable)
- ☐ Spare infrared (IR) burners

ENERGY EFFICIENCY TIP

In commercial kitchens, underfired broilers use the most energy per linear foot. Be sure to turn off sections of the broiler when not in use. Minimize preheat and idle time. Turn the broiler off during down periods. Consider energy-efficient designs like broilers equipped with IR burners, IR plates, or a lid. These designs have demonstrated an average 30% energy savings over standard models in field studies.

CLEANING TIPS

Turn the broiler off and allow ample time to cool. Care should be taken to avoid any water spray contacting a ceramic burner face. Never soak ceramic burners. Clean both sides of the grates and the rack frequently with a wire brush when warm to reduce smoking and flare-ups. Clear buildup in the troughs on either side of the grate rib to allow fat and drippings to run off.



Safety Warning: Keep grease trap clean to prevent grease fire or flare-ups from excess fat.

Required Regular Maintenance:

- ☐ **Daily:** Remove and clean grease pan.
- ☐ **Daily:** Clean drip shields, baffles, and sides of broiler with a damp cloth.
- ☐ **Daily:** Scrape food build-up off grates and radiants.
- ☐ **Daily:** Check for proper burner adjustment. Flames should be blue. Adjust air shutters as needed.
- ☐ **Daily:** Inspect and clean burners.
- ☐ **Weekly:** Check and turn briquettes or lava rocks (if applicable).
- ☐ **Weekly:** Inspect and replace radiants if they are warped, broken, or deteriorating.
- ☐ **Semi-Annually:** Replace briquettes or lava rocks (if applicable).
- ☐ **Semi-Annually:** Replace infrared plates (if applicable).



BROILERS: CONVEYOR

PRIMARY MAINTENANCE ITEMS

Conveyor broilers have cooking chambers with conveyor belts to broil food under high temperatures. These broilers have infrared (IR) burners as the source of heating. The upper IR burners provide high-intensity heat (> 700°F) to accelerate surface browning during cooking and are mostly used to cook burger patties. The tiles or screens of the IR burner face radiate heat down toward the food product. It is not uncommon for the lower burners to also have an IR design, but these burners must be shielded from fat drippings to keep the burner face from failing. Some conveyor broilers use open flame tube burners under the conveyor belt to avoid food product drippings from deteriorating the burner face.

Due to their high temperatures and grease generation, conveyor broilers require daily maintenance and cleaning for proper operation. The primary maintenance items for conveyor broilers include the conveyor belt (pg. 28, bottom), IR burners, and the catalysts (pg. 28, top).

Essential Maintenance Supplies:

- ☐ Soft bristle brush, scrub, and/or sponge
- ☐ Small and large orifice brushes
- ☐ Manufacturer-recommended cleaning agent
- ☐ Spare IR burners
- ☐ Drive chain lubricant

Required Regular Maintenance:

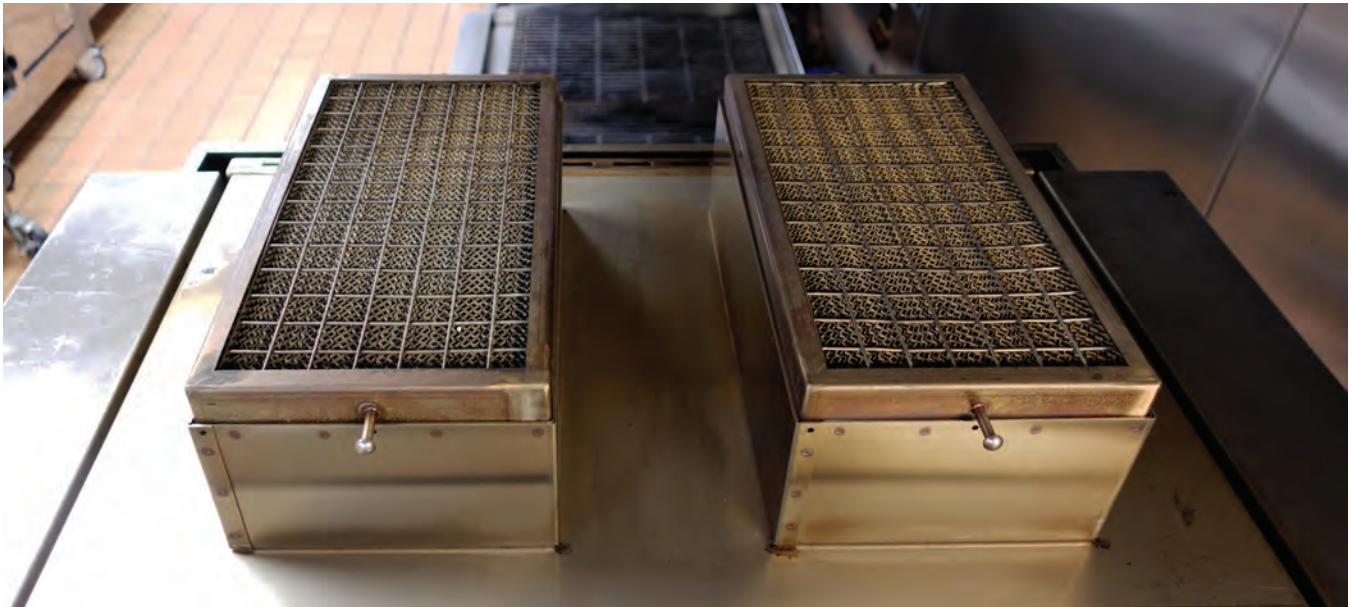
- ☐ **Hourly** or **Daily:** Remove, clean and replace meat guides and feeder covers.
- ☐ **Daily:** Remove, clean and replace grease trough, grease box, and crumb tray.
- ☐ **Daily:** Remove, clean and replace heat and pan shields, feeder base/housing, lower burner catalyst, and other removable parts.
- ☐ **Weekly:** Clean upper burners and air boxes. Inspect upper burners for cracks or hot spots.
- ☐ **Monthly:** Inspect and clean burner orifices and pilot burners.
- ☐ **Monthly:** Clean pilot orifices and flame sensors.
- ☐ **Quarterly:** Inspect conveyor belt and chains for proper tension. Adjust as needed.
- ☒ **Semi-Annually:** Lubricate conveyor drive chain.



Conveyor broilers operate at 700°F to apply sear marks onto burger patties and other protein products. At these temperatures, the metal, chain-link, conveyor belt will easily release the cooked burger patty. If meat product begins sticking to the conveyor belt as it exits the cooking chamber, this can indicate temperature loss and a potential problem with the burners. Dirty or blocked orifices can also negatively affect burner performance. Inspect the burners for cracks or hot spots and call a service professional, if necessary.

The conveyor belt and chains will gradually expand with continued operation. Belt expansion will affect the drive system and will need adjustment. Refer to your manufacturer's literature for further instruction. Some conveyor broilers utilize a power burner system with a fan. As with other equipment with fans, it is important to keep the fan wheel clean and free of debris and dust/lint as any change in air volume will affect the IR burner and can lead to extended cooking times.

Safety Warning: Due to the high operating temperatures of conveyor broilers, ensure that the workstation is clean and free of any combustible materials like food wrap, aerosol spray cans (oil spray), etc.



ENERGY EFFICIENCY TIP

In field studies, conveyor broilers have demonstrated energy savings of up to 30% over their underfired broiler counterparts. Consider a conveyor broiler for your operation when it comes time for a replacement.

CLEANING TIPS

Conveyor broilers require daily cleaning. Allow the conveyor broiler to cool for at least 30 minutes prior to cleaning and disassembly.

Leave the ventilation system running during the cooling period.

Safety Warning: Wear heat-resistant gloves when handling burners, catalysts, and other hot metal parts during cleaning to avoid burns.

The tile faces of the IR burners are sensitive to moisture - do not clean these burners with water, which can shorten a burner's life.

Safety Warning: Burner must be completely dry before reassembling.

Conveyor broilers contain many removable parts that can differ between models. Check the owner's manual or contact the manufacturer for specific cleaning instructions.





DISHWASHING MACHINES

PRIMARY MAINTENANCE ITEMS

The dishwashing machine is the primary sanitation equipment in a commercial kitchen and the cornerstone of both front-of-house and back-of-house operations. As these machines are subject to inspection by your local health department to ensure code compliance, proper dishmachine cleaning and maintenance is critical to avoid unexpected shutdowns. Dishmachines come in a variety of types including undercounter, door-type, rack conveyor, and flight-type machines. There are two types of dishmachines based on sanitation method: chemical sanitizing (low temperature) and hot water (high temperature) sanitizing. Low-temperature machines rinse at 140°F with the aid of chemical sanitizing agents; high-temperature machines wash and sanitize wares at 150-160°F with a final rinse at 180°F, which is a hot enough to sanitize without chemicals. The primary maintenance items for dishmachines are rinse temperature and pressure, water leaks, and descaling.

Essential Maintenance Supplies:

- ☐ Manufacturer-recommended wash agent
- ☐ Replacement curtains and nozzles
- ☐ Manufacturer-recommended descaling solution

Required Regular Maintenance:

- ☐ **Daily:** Note the rinse temperature and pressure as well as the working tank temperature. If any are out of specification, your dishmachine needs service.
- ☐ **Daily:** Check detergent, sanitizer, and rinse aid levels.
- ☐ **Daily:** Perform a comprehensive water leak check.
- ☐ **Daily:** Check for malfunctioning drain valves.
- ☐ **Daily:** Clean scrap trays and filters.
- ☐ **Daily:** Inspect and replace worn or damaged plate sensors (flight-type machines).
- ☐ **Daily:** Ensure that the doors are functioning correctly. Leave doors ajar after hours.
- ☐ **Weekly:** Check for damaged or worn curtains in the dishmachine and replace, if necessary.
- ☐ **Weekly:** Check for worn rinse nozzles. Replace when necessary.
- ☐ **Monthly or Quarterly:** Descale your dishmachine.
- ☒ **Annually:** Have a qualified professional inspect your machine.

If scale build-up is left untreated in your dishmachine, it can cause premature failure of heating elements, affect the accuracy of electrical sensors, affect rinse and wash performance, and may result in increased bacteria growth. For more on water quality and descaling, refer to the **General Maintenance** section of this guide.

ENERGY EFFICIENCY TIP

A common installation and setup mistake for dishmachines is that the rinse pressure (bottom right and left) is set too high. Setting the rinse pressure too high can lead to doubling the overall water and energy use of the machine. Because excessive water and energy are difficult to detect visually, these rinse problems can go unnoticed for the dishmachine's lifetime. Most machines are recommended to operate at 20 psi for optimum water and energy efficiency. Check your dishmachine's rinse pressure often and service, as necessary.

Flight-type machines have plate sensors that hang above the conveyor belt and trigger the machine to go into wash mode when plates or other wares are present on the belt. These sensors can become loose or damaged in a way that will trigger the machine to run all the time. Inspect and tighten or replace these sensors to keep the machine running as efficiently as possible.



CLEANING TIPS

Train staff to scrape and pre-rinse wares thoroughly before they are loaded into the dishmachine - this will optimize cleaning performance and prevent overloading and clogs. Nozzles can get clogged by limescale, food solids, and other debris, which can cause the wash and rinse pressure to drop and negatively impact dishwashing. Frequently inspect the wash and rinse arms or rotors (top right) for clogs. If you spot a clog, remove the arms, unclog the nozzles with a thin wire or other sharp implement, rinse under running water, and replace. Chlorine-based cleaning agents should never be used on dishmachines.

Leave the dishmachine door(s) open when not in use and after cleaning to allow the machine to air dry. Leaving the door open will help minimize interior humidity and prevent bacteria build-up.



WATER HEATERS & BOOSTER HEATERS

TANK WATER HEATERS

Commercial tank water heaters are similar to residential water heaters with the most common size being 80 gallons. The burner is located in the bottom geometric center of the tank and the flue goes through the center of the tank. The two main types of tank water heaters are standard and condensing. Standard water heaters have a flue exiting the top of the water heater which needs to be vented to the outside. Usually, there is an air gap built-in at the top of the water heater.

Instead of an open flue on its top, condensing water heaters (right) route the flue gases into a heat exchanger to maximize the amount of heat absorbed by the water. The flue gases are cooled down to the point where they condense. The flue condensate needs to be discarded, meaning that these water heaters require drain access. An additional condensate drain pump may be needed if the drain is far away. Condensing water heaters also require an electrical connection to run fans and controls.



TANKLESS WATER HEATERS

Tankless water heaters (left) are appealing because of their small footprint, but these heaters are equipped with all the same components as a tank water heater only with a much smaller tank. These water heaters have a 1-3 gallon holding capacity but are designed to deliver large amounts of heat to a small volume of water continuously as water passes through the heat exchanger. Tankless water heaters have more complex control systems than tank water heaters with flow switches for the burner to react to intermittent water heater flow demands. These controls require an electrical connection. Multiple tankless water heaters can be installed in parallel or series.

BOOSTER HEATERS

Booster heaters supply 180-190°F water to high-temperature dishmachines for rinse cycles. Booster heaters are installed next to the dishmachine to bring domestic hot water from 120-140°F to the proper dishmachine rinse temperature. They have a similar design to instantaneous water heaters but operate at higher temperatures and need to be installed with a temperature and pressure relief valve.

Gas booster heaters need their flue routed either separately outside or inside the dishmachine exhaust hood.

PRIMARY MAINTENANCE ITEMS

The primary maintenance items for water heaters include the pilot light thermocouple, the ignition module, the gas burner on/off solenoid, and the mechanical thermostat. Most common water heater failures are associated with electrical components that can be easily replaced. Water heater tanks and burners are relatively reliable and do not often fail prematurely.

It is recommended to keep a few backup parts on hand for your specific water heater model so they can be easily swapped out by a qualified professional to expedite the repair process.

Essential Maintenance Supplies:

- ☐ Pilot light thermocouple
- ☐ Mechanical thermostat
- ☐ Temperature & pressure relief valve (for booster heaters).
- ☐ Ignition module

Water heaters are generally low maintenance items and do not require frequent maintenance. However, it is recommended to inspect your water heater at least once a month.

Water heater longevity depends on water heater demand. Water heater burner cycling causes thermal expansion and contraction of components reducing their life. Sometimes water heaters fail completely and need to be replaced entirely. This process can be labor intensive; however, a replacement can be significantly simplified if the path to the water heater is kept clear and all the water and natural gas connections are in good condition. Being able to easily undo the water heater connections for a speedy changeout can save on installation costs.

Information of the qualified professional who initially installed the water heater should be clearly displayed on the water heater itself so they can be contacted if a failure occurs.

Like other water-using equipment in this guide, local water quality can affect the longevity of your water heater. As discussed in the **General Maintenance** section, a water supply analysis will determine whether adding filtration will increase the life of the heater by preventing scale buildup from hard water. While this guide highly recommends water filtration systems for steamers, combi ovens, and other equipment, these systems may not be cost-effective to add to a primary water heater with large demand.

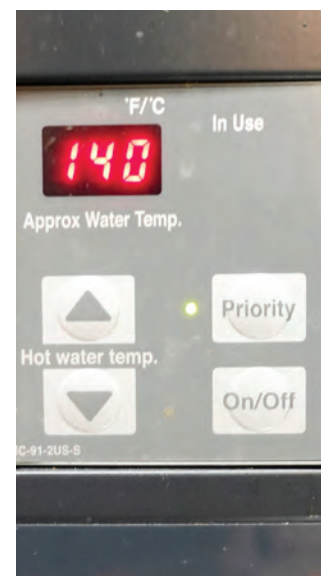
Required Regular Maintenance:

- ☐ **Daily:** Keep pathways to the water heater clear of clutter and obstructions.
- ☐ **Monthly:** Verify that the thermostat is set correctly (usually 140°F).
- ☐ **Monthly:** Check for water leaks at the inlet/outlet of the water heater.
- ☐ **Monthly:** Inspect the flue ducting for signs of corrosion or holes.
- ☐ **Monthly:** Inspect the flue insulation on the water heater outlet. Replace if worn.
- ☐ **Monthly:** Inspect the pilot for proper flame characteristics.
- ☐ **Monthly:** Verify that the condensate drain is not clogged (condensing water heaters).
- ☐ **Monthly:** Verify that the condensate pipe is gently sloping to the drain and not leaking (condensate water heaters).

ENERGY EFFICIENCY TIP

Many foodservice facilities have a hot water recirculation loop. Adding a demand recirculation controller on the recirculation loop will reduce the water heater burner cycling when the facility is closed, extending the life of the water heater, and reducing energy use.

When replacement is necessary, consider condensing water heaters that are more energy efficient with thermal efficiencies closer to 95% compared to the 80% of a standard water heater.





VENTILATION

When operating gas equipment in enclosed spaces such as commercial kitchens, cooking plumes (vaporized grease, smoke, and heat) and combustion products must be removed efficiently and replaced with fresh air per code requirements. The exhausted air from the kitchen should equal the replacement (or makeup) air to the space; this is what is called a “balanced” ventilation system. Proper balance in a commercial kitchen ventilation system is critical to indoor air quality and ambient comfort for kitchen staff as well as improving the overall efficiencies of your equipment lineup and the ventilation system itself. An unbalanced system can cause many operational problems and may make equipment appear faulty. *For more guidance on commercial kitchen ventilation systems and foodservice equipment ventilation requirements, please consult the Optimizing Commercial Kitchen Ventilation design guide series: caenergywise.com/design-guides*

INSPECTION & CLEANING SCHEDULE

As grease can solidify and accumulate in ducts over time, regular inspection and cleaning of your ventilation system is required by code and essential to avoiding a severe fire risk. Schedule to have your ventilation system(s) professionally inspected and cleaned **at least**

semi-annually. High-volume kitchen operations (24-hour cooking, char-broiling, etc.), should schedule cleanings at least quarterly. For operations using solid fuel cooking, schedule a monthly cleaning.

Required Regular Maintenance:

- ☐ **Daily:** Inspect hood filters (pg. 34, bottom left) for damage or signs of wear. Replace, if necessary.
- ☐ **Daily:** Clean out the grease drain and grease collection cups/traps.
- ☐ **Daily:** Note any odd noises or potentially failing parts from the exhaust fan. Call a qualified professional if needed.
- ☐ **Daily** or **Weekly:** Clean hood filters by soaking them overnight or washing them in the dishmachine.
- ☐ **Weekly:** Wipe down hood surfaces with a damp cloth and a water-detergent solution. Clear with a dry cloth.
- ☐ **Weekly:** If your hood is equipped with temperature, optic, and/or infrared sensors, keep them clear of obstructions and clean, as necessary. Also check the DCKV control panel for unplanned operator override or other system faults.

EQUIPMENT VENTILATION

Make sure your ventilation exhaust rate is properly adjusted for your cookline. An underrated exhaust will result in smoke, pollutants, and heat spilling into the kitchen space and equipment panels and controls getting hot, creating burn hazards and potential premature control failure. An overrated exhaust will pull heat from equipment too quickly, reducing their temperature, lengthening cook times, and producing a less desirable food product. The flame characteristics of gas equipment may also be adversely affected by a ventilation system that is pulling too much air. Be mindful of drafts in your kitchen caused by open doors or windows. Drafts can negatively affect ventilation system performance and interfere with combustion and equipment operation. Engage an air-balance professional to check and rebalance your system if the exhaust hood appears to be drawing too much or too little air.

Even slight changes in front-to-back or side-to-side equipment positioning can have a substantial impact on your ventilation system's effectiveness in capturing and containing cooking plumes. If you rearrange, move, or acquire new equipment for your operation, plan on re-tuning your ventilation system through a qualified professional to account for the changes.

Equipment flues must be kept completely clear for proper operation and ventilation into the exhaust hood. Even partial blockage will cause operational problems and incomplete combustion from burners not venting properly.



Fryer flue openings, in particular, should not be located close to an intake or exhaust fan. Adequate clearance distances must be maintained from the top of the flue to the lower edge of the ventilation filter.

ENERGY EFFICIENCY TIP

Building codes dictate the ventilation requirements for each equipment type. Cooking equipment classified as heavy-duty (like broilers) require higher minimum ventilation rates than lighter duty equipment (like ovens). When a variety of equipment duties comprise a cookline, the ventilation rate must be set to exhaust the heaviest duty equipment on the line. As a result, adequately ventilating a commercial kitchen space can be the most expensive operation in your facility at over 60% of the total utility cost.

Consider installing a demand-controlled kitchen ventilation (DCKV) system, which can dramatically reduce ventilation costs for commercial kitchens. DCKV systems can vary the hood exhaust rate based on temperature sensors that measure the heat load, and/or optical/infrared sensors that detect the presence of a cooking plume generated by the equipment. Instead of always running the exhaust fan regardless of cooking load, DCKV systems modulate the amount of air exhausted in response to a full-load, partial-load, or no-load cooking scenario.

Installation of side panels (bottom right) on each end of the hood has also shown to dramatically improve ventilation system capture and containment performance.



FIRE SUPPRESSION SYSTEMS

Fire codes require inspection of your fire suppression system by a qualified professional **at least semi-annually**. These inspections will confirm that the system is functioning correctly, prevent unwanted/untimely discharges, and ensure that the system will pass an unannounced code enforcement inspection or insurance audit. Operators should perform a monthly visual inspection of the fire suppression system in addition to the semi-annual inspections.

Monthly System Maintenance:

- ☐ Check that all fire suppression nozzles in the hood are pointed directly at the appropriate equipment.
- ☐ Ensure that fire suppression nozzles in the hood are capped to prevent grease buildup from blocking their discharge (top right).
- ☐ Check for buildup of grease in the hood and ducts.
- ☐ Ensure the fire protection system gauges are “in the green” and in operable range.
- ☐ Ensure the pull station is easily accessible and not blocked.
- ☐ Verify that the fire system inspection sticker is clearly visible. Verify the date of the last professional inspection.
- ☐ Verify the hood cleaning compliance sticker is clearly visible on the hood. Verify the date of the last professional cleaning.
- ☐ Ensure portable fire extinguishers are easily accessible and not blocked.
- ☐ Ensure fire extinguishers are fully charged - check that the gauges are “in the green” (bottom left).
- ☐ Verify that the fire extinguishers are appropriate for use in commercial kitchens.





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All photos are for informational purposes, taken prior to COVID-19. SoCalGas is currently practicing all safety protocols consistent with local and health agency guidelines.

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