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Commercial Kitchen Design ©

Need To Know Information & Strategies

Reduce Cost & Increase Profits

Introduction

Kitchen Design Is ALL About Your Bottom-line! With the high cost of rent, utilities, labor, construction and equipment purchases; it is necessary to have a good kitchen design that is functional and efficient. Mistakes made in the layout, design and equipment purchases can be extremely costly, hamper operations and the ability to effectively produce a quality meal. This guide can get you started in the right direction. If you would like more assistance; we offer a variety of design services that will help put more dollars back in your pocket.

Establish a Realistic Budget & Timeline- There is an endless list of details that need to be taken into consideration on any commercial kitchen project. Needless to say; many entrepreneurs drastically underestimate their budgets and the work involved. It is common to find projects running out of money and months over schedule because of all the things they never anticipated. Avoid guesswork, pay attention to all the details and seek out expert advice when needed. After you have a good working budget you should continue to monitor and adjust it as the project progresses. Pay careful attention to actual expenses vs. projected expenses and keeping an eye on the bottom-line.

Invest Wisely! Remember your kitchen is the engine of your business and the goal is to take your restaurant on a long and successful ride. To help ensure your success you need the engine to be designed for optimal performance. Investing the time and money in the back-of-the-house (kitchen) will increase your MPG, overall performance and financial rewards over the years.

Space Requirements: The rule of thumb for a full service restaurant is aprox. 5'sq/ft of kitchen

space for every seat. That space can be greater or smaller depending on several variables such as using prepared food, take out service and the type of restaurant. For example, a 60 seat restaurant with minimal takeout service, would require approx. 300 sq/ft of usable kitchen space.

Energy Usage: Restaurants spend as much as 30% of their overhead costs on utility bills. A good kitchen design needs to be energy efficient to help reduce cooking, heating and cooling cost. The biggest and most common problems are found in the HVAC / hood system. For more info: refer to Part II "**Equipment & Energy**" when designing or renovating your kitchen or to find ways to reduce your energy bills. .

Getting Started!

STEP I - It All Starts with The Menu! A common problem is building the kitchen first then designing the menu after. The menu needs to be established first and then the kitchen design should meet the specific needs. By starting with the menu and deciding just what you want your kitchen to be capable of producing, you will save on unnecessary expenses and labor.

STEP II - From Menu to Floor Plan. After you have your menu decided on, you need to focus on the kitchen layout and design. There are many important reasons why you want to take the time to develop a functional and effective kitchen design, before you begin work. First, you will need to decide whether you're going to use a professional designer, or try to do-it-yourself. Either way, it is vital that you're informed on the elements of good kitchen design.

STEP III - Seek-out Expert Advice - Whether you choose to do-it-yourself or use a designer; you will need reliable information to make smart and informed decisions. So do your homework! The more you know, the less likely you will foolishly or naively waste money!

Working with a Designer

Be careful in choosing a commercial kitchen designer, because choosing a designer is like choosing someone to manage your financial investments! Understand that the major part of your business start-up cost will most likely be spent in the kitchen. The goal is to achieve the best results for the money that you're investing!

Typically, commercial kitchen designers are either an equipment salesperson, or an architect. However, they may or may not actually know how to design an efficient & functional kitchen. Either way, don't be influenced by a fancy/ professional looking blueprints or CAD drawings, Before you begin, ask about their experience in commercial kitchen design and ask for references from completed projects. Then hit the streets and visit the restaurants they designed. Talk to the chefs, cooks and wait staff. See for yourself how well the kitchen functions and ask the owner if the kitchen meets his needs and expectations. Below is a list of "Symptoms of Poor Design" you can use when checking references.

Design Fees: Equipment salesmen will typically provide a free "footprint" or equipment layout, while architects' are known to charge fairly large fees that are based on the scope of the project and/or a percentage of the projects cost. It is important to understand what support services are

included in the design work;

- Site Evaluation -Survey for potential problems, energy sourcing, capabilities and limitations.
- HVAC / Hood Design
- Kitchen and/or dining room floor plans
- Equipment layout - make sure the designer is knowledgeable on functionality to help save on energy and labor cost
- Detailed CAD Drawings
- Itemized equipment schedules
- Power loads /requirements
- Equipment cut-sheets - detail the specs on the equipment for proper installation
- Product comparisons
- Itemized budgets - which you can use in acquiring financing
- Blueprint & Mechanical drawings

Do-it Your-Self

Many restaurant owners are the "do-it-your-self" type and that's ok if you know what you're doing and don't do a patch-job. Too often restaurateurs cut corners to save on expenses. and end up; *tripping over dollars to pick-up pennies!* Use this Design Guide to help avoid many common problems and costly mistakes.

Symptoms of Poor Design

If your restaurant's kitchen is already operational and experiencing any of these problems you may want to consider modifying your kitchen design to increase profits. Are you experiencing:

- High utility bills
- Higher than normal labor cost
- Slow or uneven food production
- Poor ventilation
- Bottlenecking or employees tripping over each other
- Disorganization
- Unsanitary conditions

- Unhappy kitchen staff
- Excessive heat or humidity
- Low profit margins
- Customer complaints

Design Considerations

STEP IV - Attention to Details - Designing a commercial kitchen takes pre-planning and attention to details. Whether you are working with a designer or doing it your-self , these are some of the important issues that you should be considering:

- Budget and time restrictions.
- Cost effectiveness - original investment and the cost of operating, as related to projected income.
- Menu - What kind of equipment is needed?
- Style of Service
- Seating capacity – How much food?
- Turnover rates – How fast?
- Take-out, banquets or catering services
- Labor force – usage & flow
- Designated areas for the various kitchen functions (see list)
- Site considerations or limitations
- Available power supplies
- Inventory management - receiving, storage, security, usage
- HVAC - (heating, ventilation, air-conditioning)
- Energy efficiency - (See Part II - Equipment & Energy)
- Codes & Regulations - building, sanitation, health & safety
- Flexibility for expansion &/or revisions

Kitchen Layout & Function

Traffic Patterns & Work-stations: The goal is to create smooth traffic patterns and clearly defined workstations that do not overlap. Employees' paths should not cross! To help achieve this fundamental goal, study the layout and use a marker to **trace traffic patterns** of specific kitchen jobs. Also, use the list below to establish designated areas and workstations in the kitchen and a smooth interaction between them.

For example; a waitress with dirty dishes should not cross paths with waitresses delivering food. It is essential to create two doors to the kitchen; one for traffic "IN" the other for traffic "OUT". Where is the food picked-up and where are the dirty dishes dropped off. These paths/employees should not overlap or cross!

The lay-out begins with dividing the kitchen into the following specific areas and workstations;

- Receiving Inventory
- Cold & Dry Storage
- Food Preparation
- Cooking Line
- Holding Area
- Waitress Pick-up
- Clean-up
- Garbage
- Recycling
- Employee Break Area

Equipment Purchases

New Equipment * Quality Used * Refurbished * Leasing Arrangements

It's important to get the best product for the best value that meets your specific needs. Equipment is a big investment and each purchase will continue to effect your bottom-line over the years. So don't just look at the price tag, you need to also consider the ALL of the following;

- Quality - Life Expectancy
- What is it capable of doing and what is it limited on doing.
- Optional accessories and their cost
- Required Labor

- Energy Consumption
- Maintenance Cost
- Repair and/or replacement parts (filters, belts, accessories)
- Freight Charges
- Delivery & Installation Fees
- Manufacturers' Warranty

Quality vs. Pricing: If your budget is really tight, always ask if there's a cheaper alternative. As with any purchase you make, you need to be clear with your salesman if you're most concerned with quality or pricing. Also, consider buying quality used equipment. It may be wiser to buy a high-end used piece, rather than a cheap new piece.

For example: Stainless steel shelving or worktables have an unlimited life expectancy, while galvanized units will last only 6+years. However, shelving also varies by how much weight it can hold. Many big box discount stores are offering SS Units for less money, but they can't hold the same weight as more expensive commercial grade shelving.

Buyer Beware! Always compare your quotes and get the all the details in writing! Usually if there is a big difference in the pricing on a quote between dealers, you're probably not comparing apples to apples! There may be a difference in the quality of the product, hidden charges, or any of the above mentioned variables. Unfortunately, there are some less than reputable dealers who will **deliberately substitute a cheaper product(s)**, believing the buyer won't know the difference. Make sure you are comparing Macintosh Apples to Macintosh Apples! For example; 90,000 BTU's vs. 120,000 BTU's, size of the motor, recovery rates, energy efficiency, or the manufacturer.

Affordable Options:

- Quality used or refurbished equipment that is built to last; can save you from 30% to 50% or more.
- Leasing new equipment to reduce out of pocket expenses. It often requires little or no down payment and low monthly fees. Ice Machines are a common piece that are easily leased.

Shipping & Delivery

Always check for possible hidden fees like added fees for freight, delivery or installation. Commercial kitchen equipment can require several men or special equipment to move. Therefore know the terms of delivery and inquire about any additional cost.

Terms of Delivery - Equipment Quotes or Invoices Should Specify;

- Is the freight included in the purchase price?

- If the freight is included, then is it to your door or the dealers warehouse?
- Is there a delivery fee from the warehouse to the restaurant?
- Will the equipment be delivered to your door or will it be brought inside and set-in-place?
- Is set-up or installation included?
- If modifications are needed to the electric, gas or the site, who is responsible?
- Who is responsible for any damages? (Some freight companies refuse to be responsible for damages and don't provide insurance against it)

Damages/Wrong Item: Always thoroughly check every delivery for damages and verify that it is exactly what you ordered. Open each box! Refuse to accept damage goods/wrong item. If you accept the delivery of a damaged shipment or the wrong item, there is no compensation. If possible take a picture of the damage for your records, before letting them take it away.

Additional Expenses & Considerations

When developing a realistic budget and timeline for your commercial kitchen project make sure you consider the following;

- Fees and permits
- Electric, plumbing or gas-line modifications
- Delivery charges - Double check all quotes to verify if delivery or installation is included!
- Installation of equipment and materials
- Wall Coverings- Cooking lines require fire rated material. Always check local codes. Choose from:
 - FRP Board - \$45/sheet. (not recommended behind or near heat producing equipment)
 - Ceramic Tile
 - Stainless Steel Panels - \$130/per 4' x8' sheet (22 -26g) glued or screwed to walls
 - Durable/washable paint
- Non-skid floors and matting to prevent accidents Choose a product that is easy to clean, durable/commercial grade and resilient to water, grease, and acid.
- Proper lighting that is energy efficient and doesn't add to the heat in the kitchen.
- Hood systems for ventilation and make-up air

- Fire suppression system
- Food preparation equipment & worktables
- Shelving & storage - always check weight capacities of units
- Ceilings - should be easy to clean, tolerance to high levels of humidity, and fire rated
 - Sheet-rock/plaster
 - Drop ceilings that are fire rated
 - FRP lined ceiling tiles (durable & washable)
- Security - to prevent /reduce employee theft

PART II

Equipment & Energy

Ice Machines * Refrigeration * Dishwashers * Cooking * HVAC

Introduction

Energy Efficiency is Critical to Your Profitability! It is estimated that 1/2 of your total energy bill is related to refrigeration, food prep and cooking. Furthermore, as the cost of energy continues to go up, profits margins continue to go down! In response, we have outlined some need-to-know information and strategies that can help you lower your utility bills by 30% or more. Better yet, many of these ideas require little or no real financial investment! Remember, even small changes in the way you manage your energy usage can make a big difference in your bills.

Need-to-Know Information & Strategies

Ice Machines

Air Cooled * Water Cooled * Remote Air Cooled

- **Ice Machines are energy guzzlers!**
- Don't buy a unit that produces more ice then you need.
- Locate Ice-Machines in cooler areas away from anything that produces heat!
- If a unit is located outside, keep it out of the sun or build a sun screen/shelter. This can cut operating cost by 50%.

- Investing in energy efficient units such as **Manitowoc** can save hundreds of dollars per year.

There are 3 Types of Ice Machines

1. **Least Efficient: Air Cooled** = Uses the MOST energy! 5.4-22.5 KW per/100lbs of ice.
2. **Semi Efficient: : Water Cooled** = More efficient then air cooled.
3. **Most Efficient: Remote Air-Cooled** = Condensers transfer the heat generated by ice production to outside the building! Plus they are less noisy.

Refrigeration

Walk-ins * Reach-ins * Display Cases

You Can Cut Energy Cost by 30% with Proper Maintenance!

- Locate refrigeration away from any heat producing equipment, in a well-ventilated area.
- Refrigeration units should be 4" from the wall, to allow for proper airflow.
- The unit should be level both; front to back, and side-to-side.
- Clean coils and filters regularly.
- Maintain proper airflow to coils, condensers/evaporators.
- Check door seals and replace worn or leaky seals.
- Check evaporators for frost. Ice build-up over 1/4 inch robs energy.
- Set defrost cycles for off peak hours.
- In dry climates set the "Energy Miser" switch. This turns off the auto heaters used to defrost.
- Load & unload frig/freezers quickly!
- Load new inventory quickly before it has a chance to warm.
- Let heated items cool before loading.
- Let frozen items defrost in the refrigerator.
- Install strip curtains to walk-ins.
- Monitor temperatures: Follow the recommended food safety guidelines, but don't over chill and waste money!
- Monitor humidity: Refrigeration efficiency is achieved with humidity levels between 40-55%.

- Check for unusual noise or vibration, it may indicate a decrease in the performance of the compressors/motors.

Cooking Equipment

Options * Selection * Cooking Methods

- Microwaves are the most energy efficient means to heat or thaw a product.
- Ovens, fryers, steamers are more efficient than range-tops, griddles and broilers.
- Pressure cookers can save up-to 66% on energy cost, because they cook at a higher temperature and the cooking is completed faster.
- Convection ovens are 23% more energy efficient than conventional ovens.
- Cooking with lids can save 8% -10% on energy.
- Idle fryers should be lowered to 200' or shut down.
- Turn off any other idle or back-up equipment during slow downs. (Example turn off an idle broiler just 1 hour a day more, can save \$400. annually.)
- Every second an oven door is open it loses 3' - 10'.
- Use a steamer whenever possible, it is the most energy efficient.
- Limit pre-heat time on steam tables, grills, and broilers to 10-15 minutes.
- Pre-heat most griddles just 6 minutes and turn off un-used sections. Cook food close together and cover items to reduce heat loss.

Dishwashers

Low Flow Nozzles * Booster Heaters * Chemical Disinfectants * Maintenance

Hot Water = 17% of your total energy bill (on avg). The good news is, you can drastically reduce this expense by 50% or more with these easy steps!

Solution #1 - Install an inexpensive high velocity - "low-flow" valve into the nozzle of the pre-rinse sprayer! You can save hundreds of dollars per year on your energy bill, as well as cut your water bill in half, by using 50% less hot water! Technology has made some great improvements in recent years on low-flow nozzles that include:

- Greater water pressure (80lbs/psi). That's more power to help get the job done!
- Automatic shut-off valve at the hose head. Water is only supplied when needed.

Solution #2 - Install a natural gas booster heater to your dishwasher. A bigger investment, but it can save 50% or more on your hot water bills and save on costly disinfectant chemicals.

- Most health codes require either rinsing in 180'+ or adding a chemical disinfectant.
- Chemicals can save on energy cost, but have added expenses, require longer drying time and can leave spotting on dishes and glasses.
- A booster heaters is attached to the dishwasher and heats just the required water to the necessary temperature for the **Rinse Cycle**.
- With the addition of a booster heater, the primary hot water heater can be maintained at a much lower temperature, saving as much as 60% on the cost of heating water and reduce the risk of scalding!
- New models of booster heaters are compact, easy to install and to use.
- Booster heaters are low maintenance and have no element to burn out.
- Booster heaters are best suited for larger restaurants that consume lots of hot water to run the dishwasher! Ask about a simple "Cost-Benefit Analysis" to determine if a investment into a booster heater can help you save on your energy bills.
- Turn-off booster heaters at night and when not in use.

More Ways to Save

- Vent dishwasher heat and humidity out of the kitchen to avoid added burden on air-conditioners.
- Check thermostats for accuracy and program proper water temperatures for each cycle; 140' wash, 160' power rinse, 180' final rinse. Save by not heating water hotter then needed.
- Check water cycles to make sure the water shuts off after the tray goes through.
- Run with full loads only!
- Replace dishwashers older then 10 years with more energy efficient models that require a lot less water and save up-to \$2,900 annually.

HVAC - Hood Systems

Heating * Cooling * Kitchen Ventilation * Make-up Air * Air Balancing

Understanding HVAC

HVAC systems consist of; heating, ventilation and air conditioning. The goal is to balance the airflow between these systems to reduce energy consumption. The problem is difficult to manage and understand because you can't see it (except on your energy bills!) However, we will try to simplify the issues, as it is very common to find even the most experienced restaurateurs with a in-effective Hood or HVAC System. More importantly, this common problem can cost plenty!

The 3 Basics Rules

1. The front-of-house and back-of-house require separate heating & cooling systems, but need to operate together in harmony, not independently.
2. Air that is exhausted through the hood systems and exhaust fans must be replaced with an equal amount of **make-up air** from another source. The goal is to establish the source for make-up air and then manage it. Make-up air should be vented in from the outdoors and tempered when it goes below 40' in the winter
3. A poorly designed or inappropriate HVAC/Hood system will result in higher energy bills, as your profits are literally being sucked out the hood!

Symptoms of an Inefficient Hood System

- Your hoods don't collect all the smoke and steam in your kitchen.
- There is excessive heat in the kitchen and your cooks complain!
- Your dining area has stale, stuffy or unpleasant odors or smells like grease.
- Your exterior doors are difficult to open, a vacuum effect.
- Or outside air rushes in when the front door opens.
- You have excessive or unexplainable utility bills.

Exhaust Fans & Hoods Systems

Managing Energy Consumption; Exhaust systems can be your biggest energy hogs! When exhaust fans are not used efficiently they can pull too much conditioned air (heated or cooled) out of the building!

- Exhaust fans need to be started before cooking begins, but also should be turned off at night or when they are not needed!
- Group all heat producing equipment together, under the hood system.
- Hood systems should be 6" longer on each side then the cooking line. Example; 6' cooking line requires a 7' hood.
- Establish a source for "make-up air". You may need to install a system to prevent drawing air from your dining area, that you paid to heat or cool.
- Upgrade to a variable-speed exhaust fan. They're more efficient, use less energy and provide for greater flexibility in managing your exhaust and air flow. Turn-up or down depending on need.
- Restroom exhaust fans can be connected to light switches, reducing unnecessary loss of conditioned air.
- Dishwashers should have a dedicated exhaust fan &/or hood to remove humidity and heat from the kitchen.

- An easy and cost-effective strategy is to install side panels to an existing canopy hood. This will improve its' performance by minimizing the effects of drafts. Side panels help capture cooking vapors even while reducing the total exhaust rate.
- Designate and train an employee in the kitchen to manage the airflow; to adjust fan speeds as needed, and to turn down or off any idle heat producing equipment.



CAUTION: Exhaust hoods capture and remove excess heat, smoke, odors, carbon monoxide and grease. It is essential to keep hoods free of grease build-up, the filters clean and the fans operating properly to prevent fires or CO poisoning in gas powered kitchens!

Heating Systems & Air-conditioning

- Install Energy Star programmable thermostats to automatically control the building's heating and cooling. These should be secure either in a remote location or locked to prevent tampering!
- Small changes in the thermostats result in big changes on the bill! Every additional degree of heating or cooling increase energy use by 4% - 5%. (Cooling a dining area to 73' instead of 76" uses 12% to 15% more energy, during summer months.)
- Turn off or turn back systems (to avoid freezing) when the building is unoccupied. This can save 1/3 of the energy used by these systems.
- Recommended settings for un-occupied buildings: 50' winter and 90' summer.
- Recommended settings for occupied buildings: 68' winter and 74'-76' summer.
- Add a vestibule to your front door; it will drastically reduce the energy for heating and cooling. Notice that most chain restaurants utilize a vestibule to reduce/ manage their energy cost.

HVAC Equipment Maintenance

Achieve optimal performance and reduce energy usage with regular maintenance!

- Clean or replace air and grease filters regularly.
- Check refrigerant levels regularly.
- Check refrigerant filters/strainers.
- Keep coils free from dirt and dust. This can reduce energy by 25% and prevent early compressor failure. (an expensive repair!)
- Check belts: tighten as needed, replace cracked belts.

- Straighten coil fans with a condenser coil comb.
- Shade outside units from sunlight.

Remember

"It Pays to Manage Your Energy Usage"

Return to equipment123.com for more information on how you can reduce overhead cost and increase profits in your restaurant! Please call us if you are interested in more info on energy efficient equipment or products to improve your current equipment's energy usage.

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