Food Service Technology Center

Promoting Energy Efficiency in Food Service

25 Energy Saving Tips

"Easy Money"

FISHER NICKEL inc.

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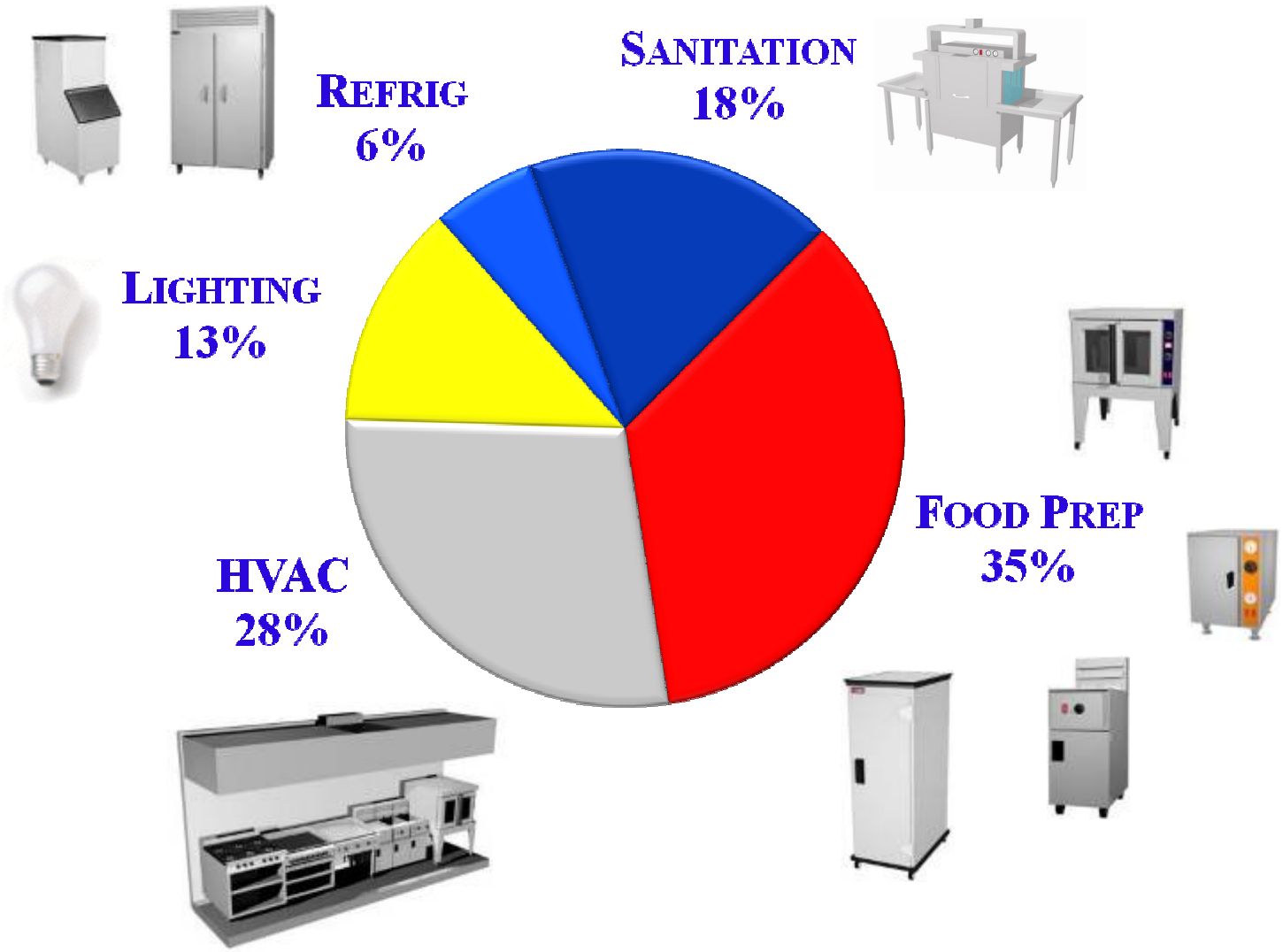
The Food Service Technology Center (FSTC) program is funded by California utility customers with public purpose program (PPP) funds and administered by the Pacific Gas and Electric Company under the auspices of the California Public Utilities Commission.

Promoting:

Energy Efficiency in Commercial Food Service

FSTC studies all the ways you use energy and water



An example of the total energy breakdown (BTU) in a full service restaurant.

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Food Service Technology Center

FSTC

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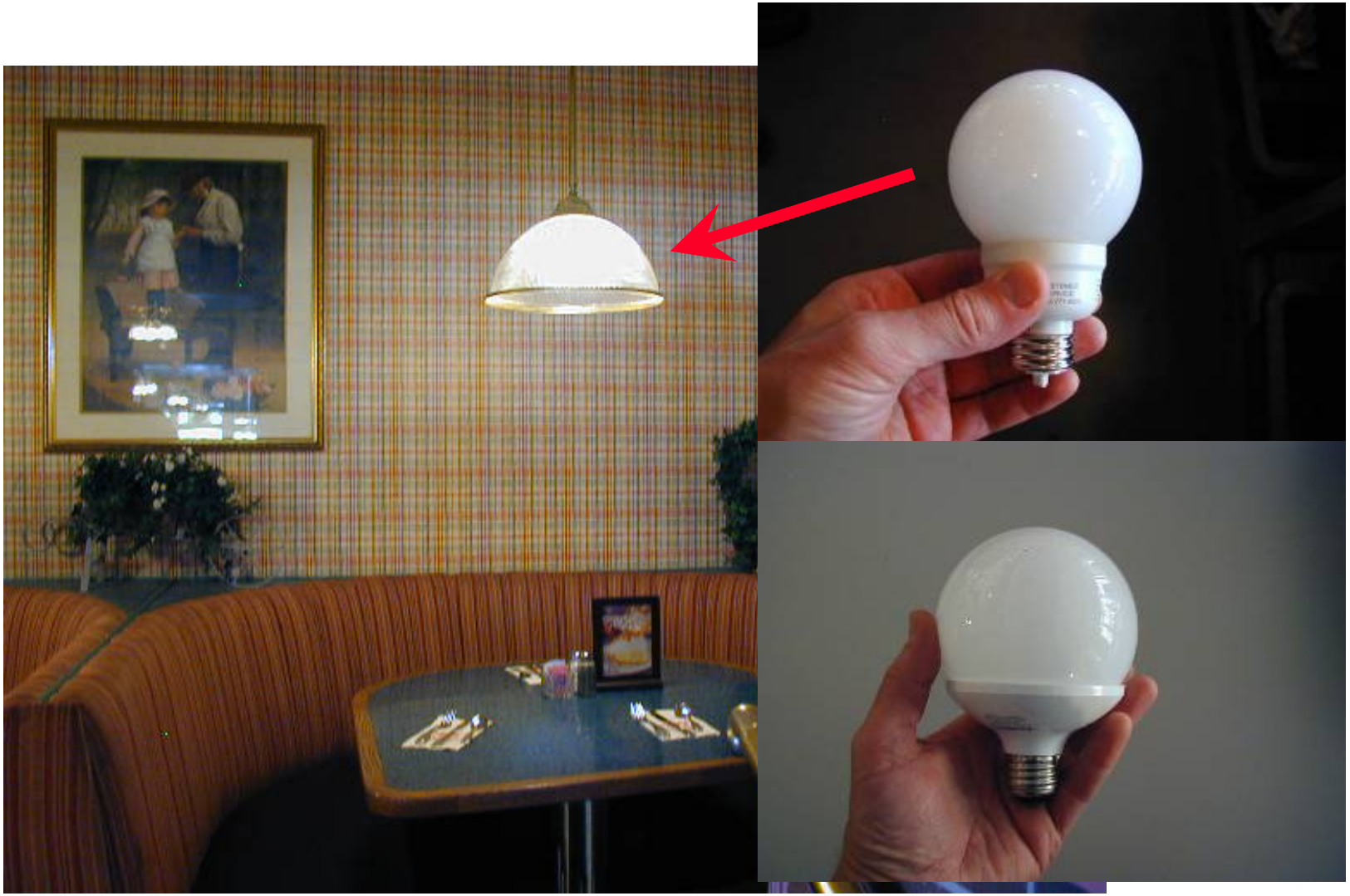
Tip #1:
Install Compact Fluorescent Lamps (CFL)

How much light do you get for your dollar worth of energy?

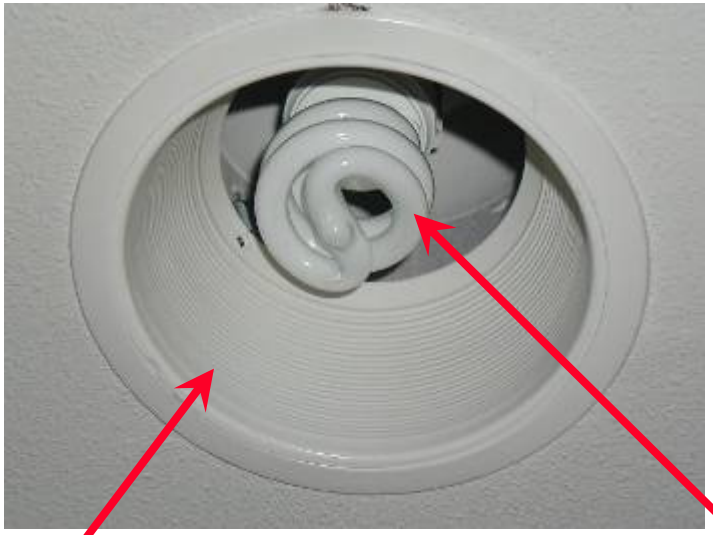
Don’t make this mistake.

Spring lamps are not decorative!

Use CFL Globe Lamps



Downlights: the wrong way!



The reflector is not right for this lamp so the light doesn't make it down to the table.

Solution…
Screw in CFL flood lamps!

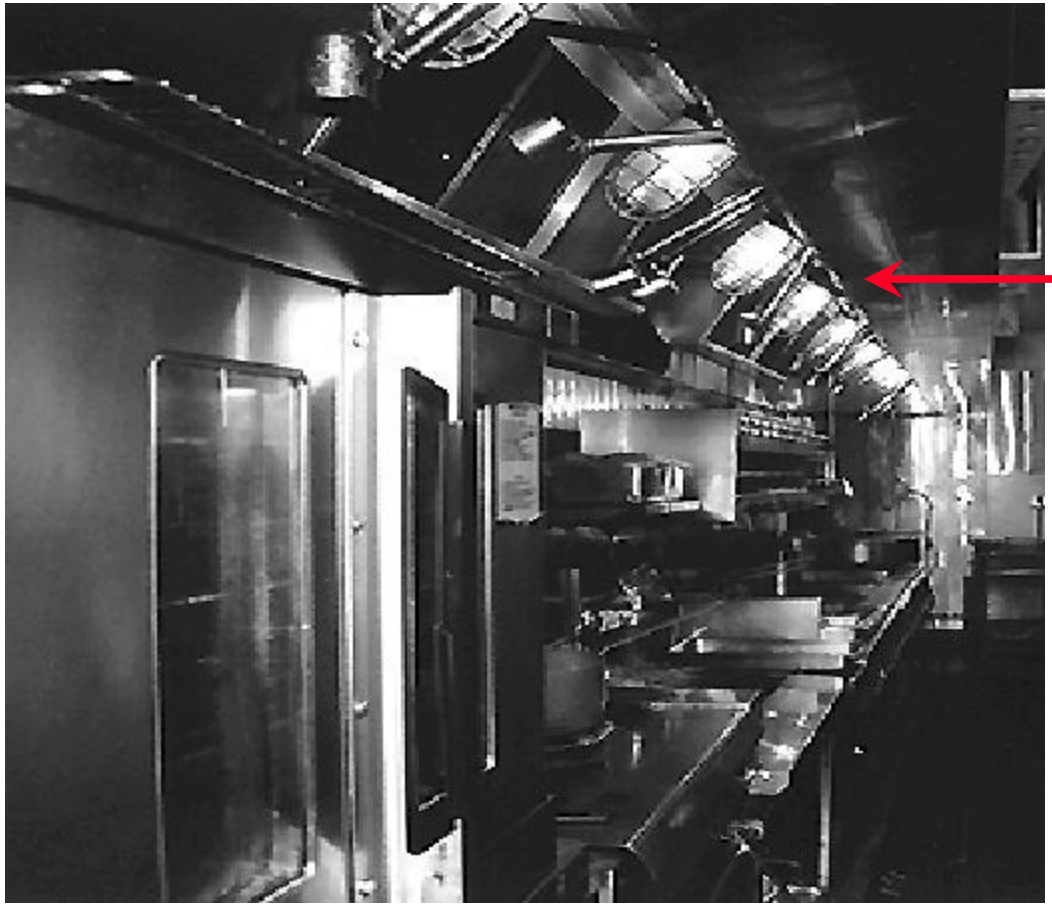
Medium Floods

Small Floods

19 Watt CFL Exterior Floods Replace 75 Watt Incandescent

Remember, if you have a dimmer you must use a dimming CFL!

(They cost about $18.)



Put CFLs in the Exhaust Hood

In this exhaust hood are eleven, 75 watt incandescent light bulbs. Replacing them with 20 watt CFL's can reduce their energy usage by $500 annually.

16 hrs/day @ $0.15/kWh

In the walk-in refrigerator:

Low-temp CFLs for freezers!

Save $50 a year per lamp!

16 hrs/day @ $0.15/kWh

Control Outdoor Lighting

Turn off parking lot lights, soffit lights, menu boards, decorative lights, etc.

whenever possible.

Never leave lights on during the daytime!

Tip #2:
Install Low-Flow Pre-Rinse Valves

Pre-Rinse Valves Not Created Equal!

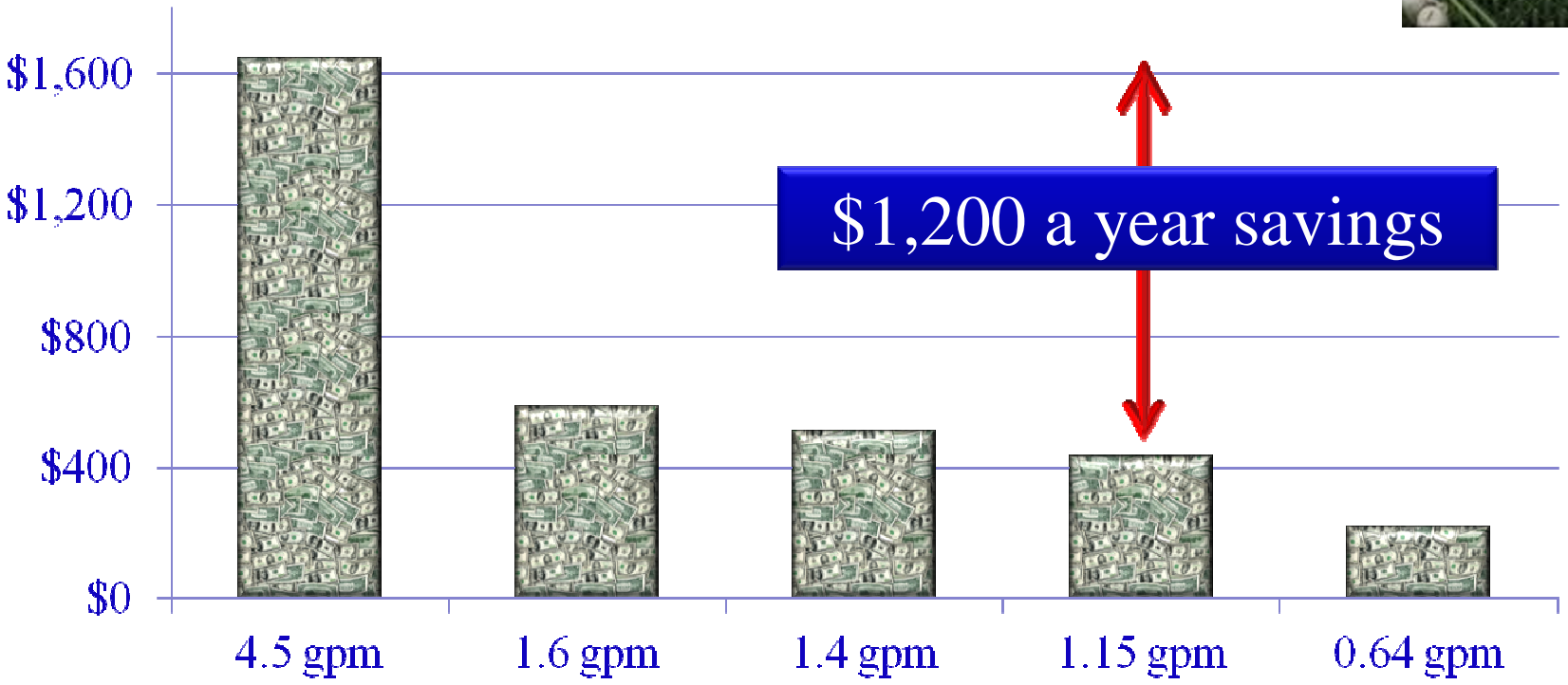
1.6 gpm | 1.6 gpm | 2.6 gpm | 4.5 gpm

$1400/yr → $4000/yr

@ 3 hr per day usage

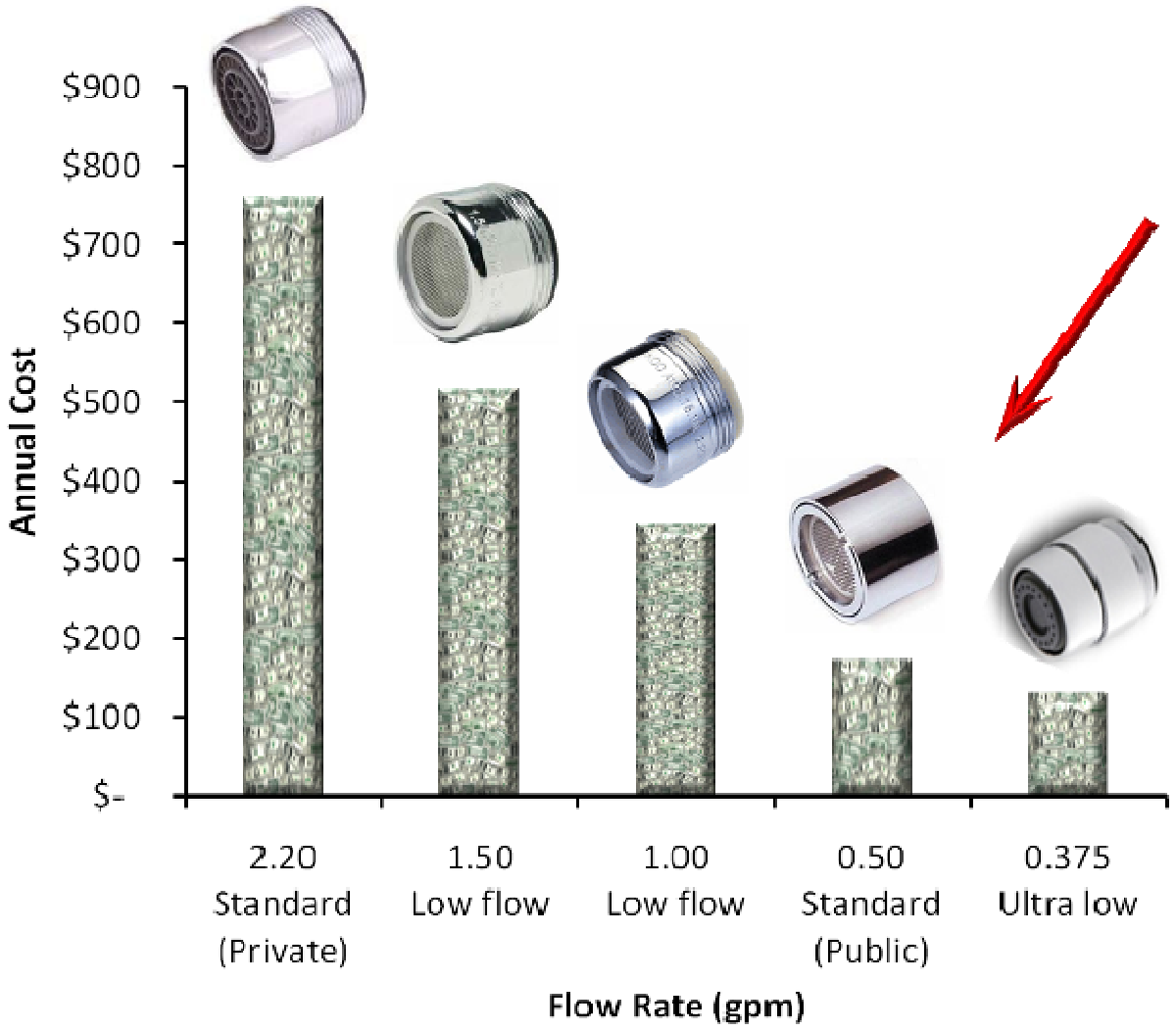
Install Low Flow Pre-Rinse Spray Values

Example: Annual Cost to Operate



1 hr of usage per day @ $1.20/therm & $5.00/Unit

Tip #3:
Replace Hand Sink Aerators



1 hr of usage per day @ $1.20/therm & $5.00/Unit

Tip #4:
Turn down drip wells.

- Water Charges $210/yr
- Sewer Charges $315/yr
- Water Heating $830/yr
- Grand Total $1,355

@ 0.15 gpm

$1.20/therm, $5.00/unit of water & sewer, 24h, 360 d/y, 140°F water

Tip #5:
Fix those leaks!

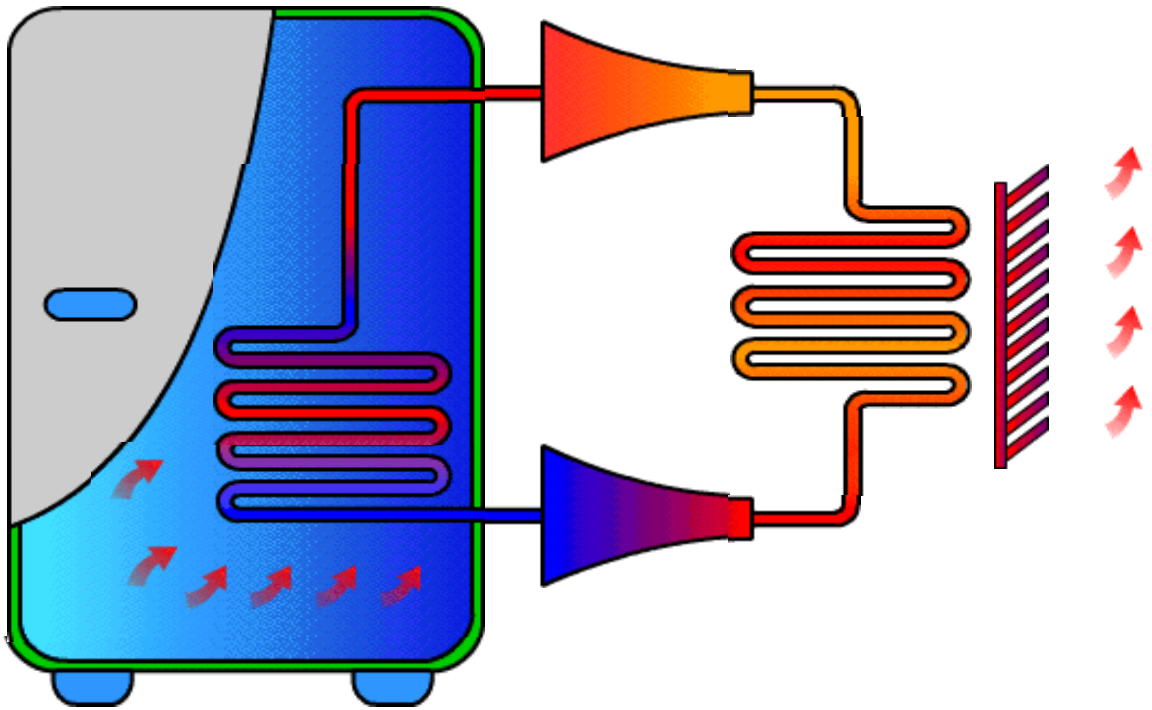
Even a small drip adds up:

- 50,000 gallons/yr
- $350 for water
- $500 for water heating

1.00/therm gas & $5.00 per unit water/sewer

Refrigeration

What is Refrigeration?
It is removing heat from the air in a box



A leaky refrigerator door wastes
expensive electricity
24 hours a day - 7 days a week

Keep the Heat Out

Maintain refrigerator doors by:

1.replacing worn gaskets,

2.aligning doors,

3.enabling automatic door closers, and

4.replacing worn or damaged strip curtains.

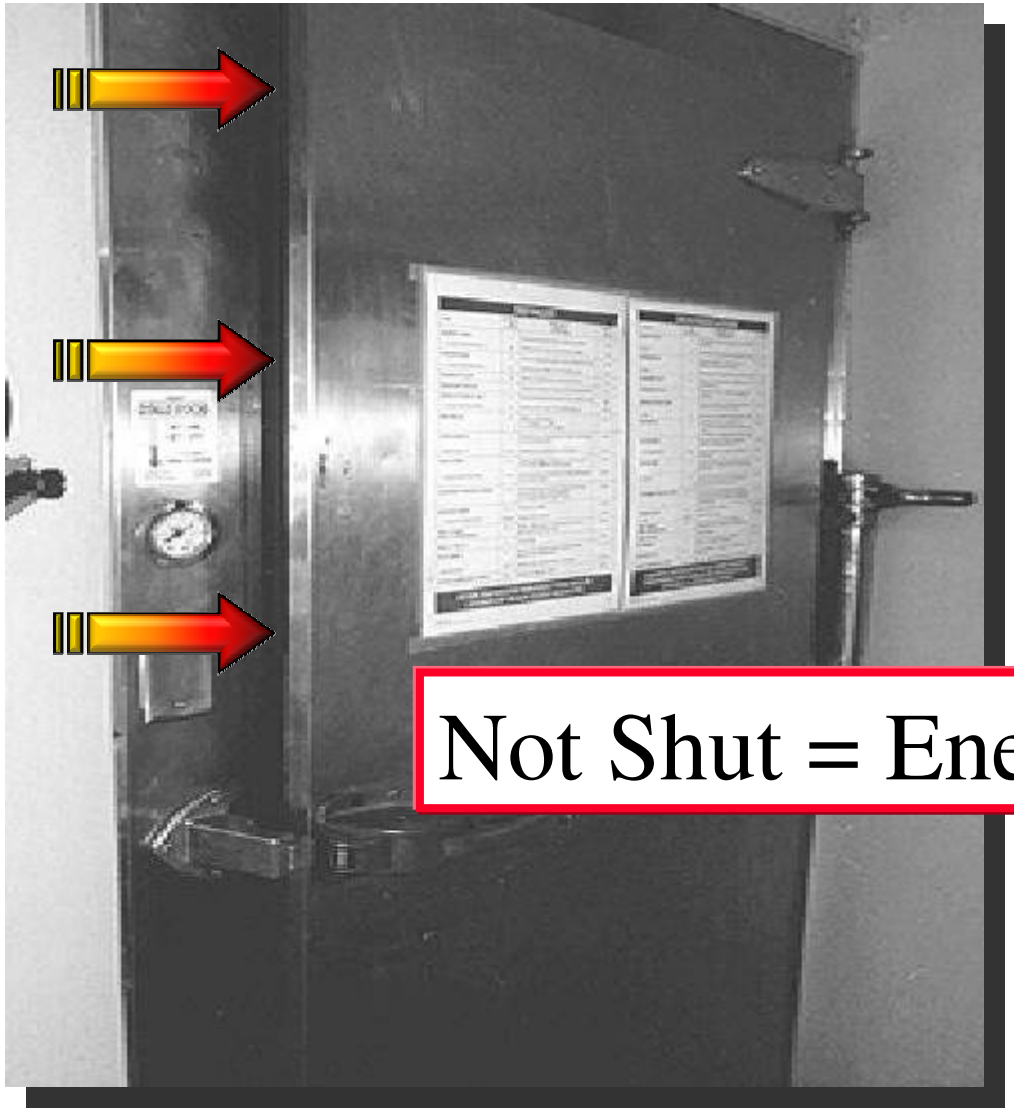
4 ON THE DOOR

Door Gaskets and Closers

Tip #6:

Make sure that the refrigerator door totally seals off the opening to the refrigerated space.

Typical Mistake

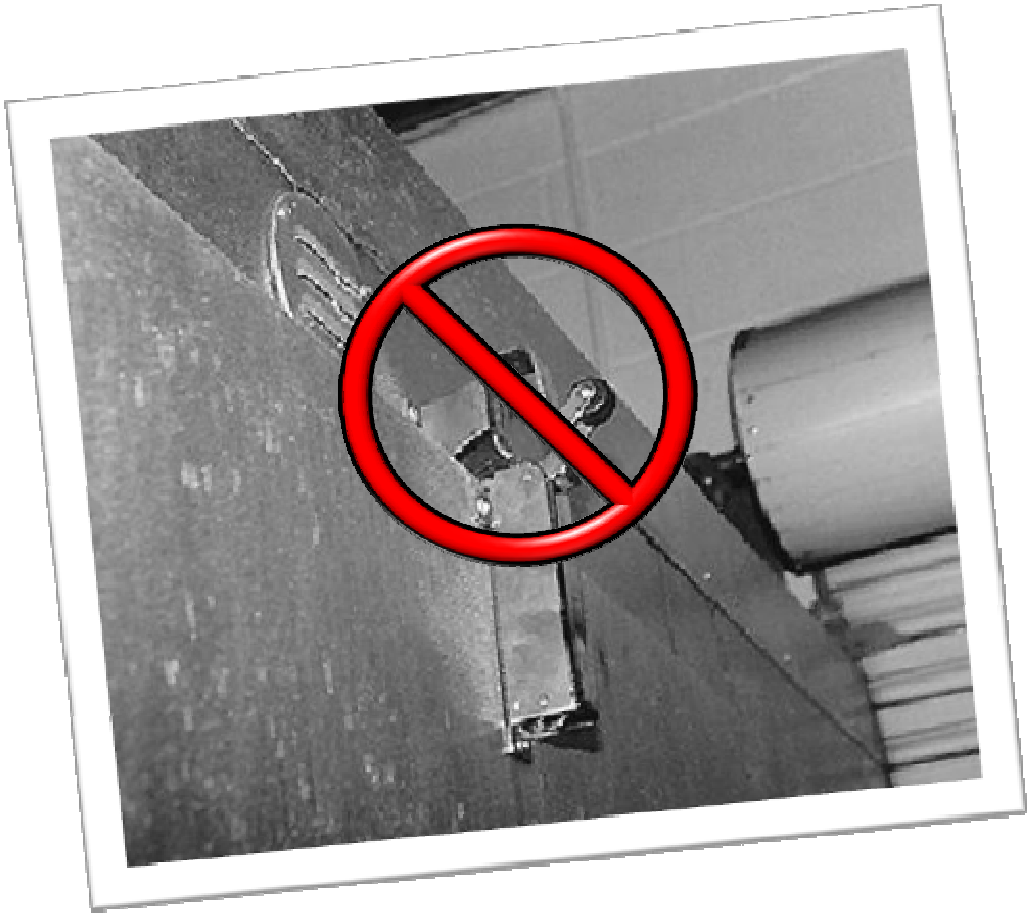


Not Shut = Energy Waste

Tip #7:
Auto-Closers For Coolers Or Freezers

The auto-closer should be able to firmly close a door that is within one inch of full closure.

Enable the Auto-Door Closer



Close the Ice Machine

Good Idea!

Tip #8:
Repair/Replace Cooler Or Freezer Door Gaskets

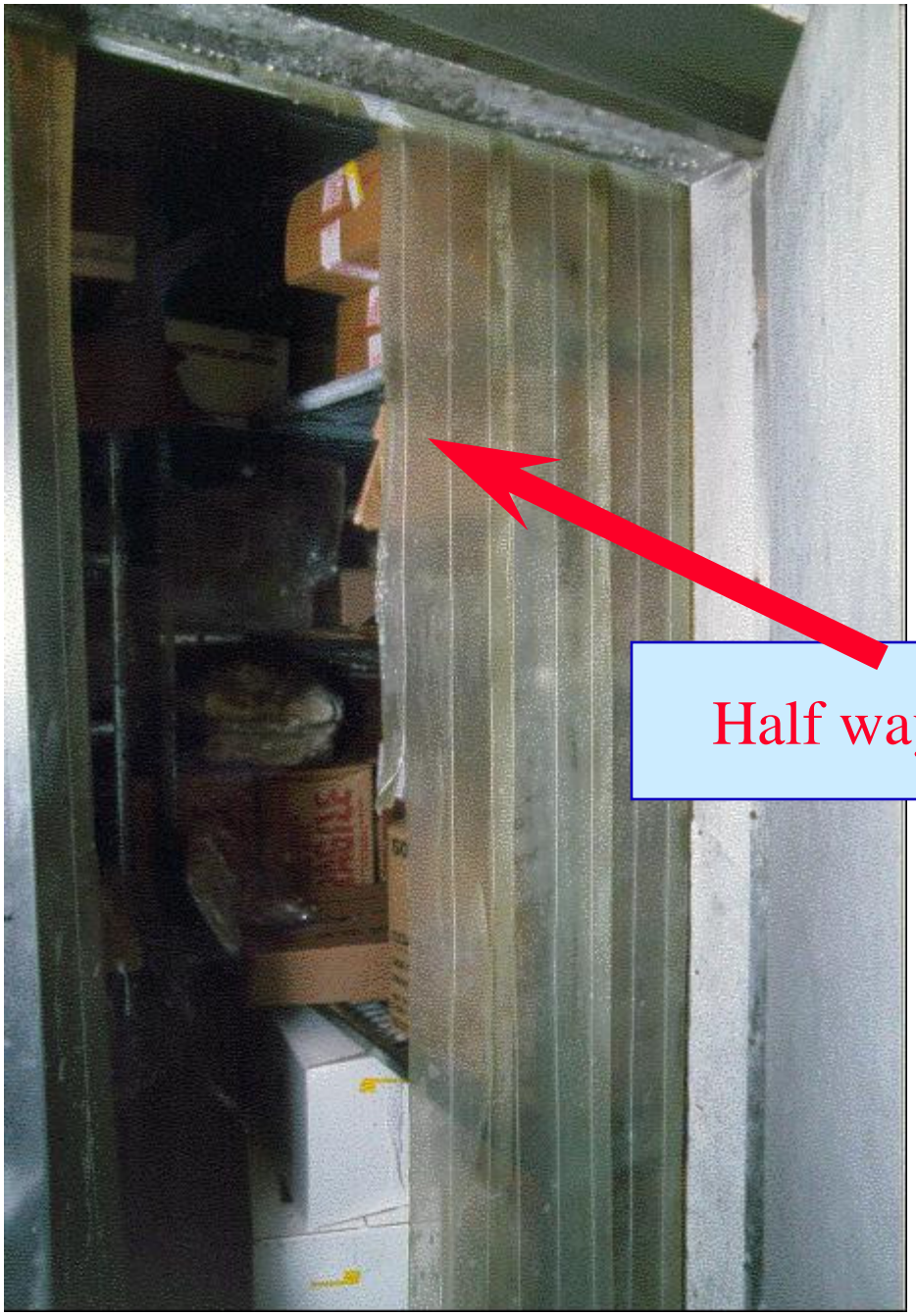
Replace a worn gaskets on coolers and freezers. Make sure that replacement gaskets meet manufacturer's specifications!

...or use a gasket replacement company that will do the whole job for you!

Align doors so they shut all the way

Mis-aligned doors = infiltration and ice on doors

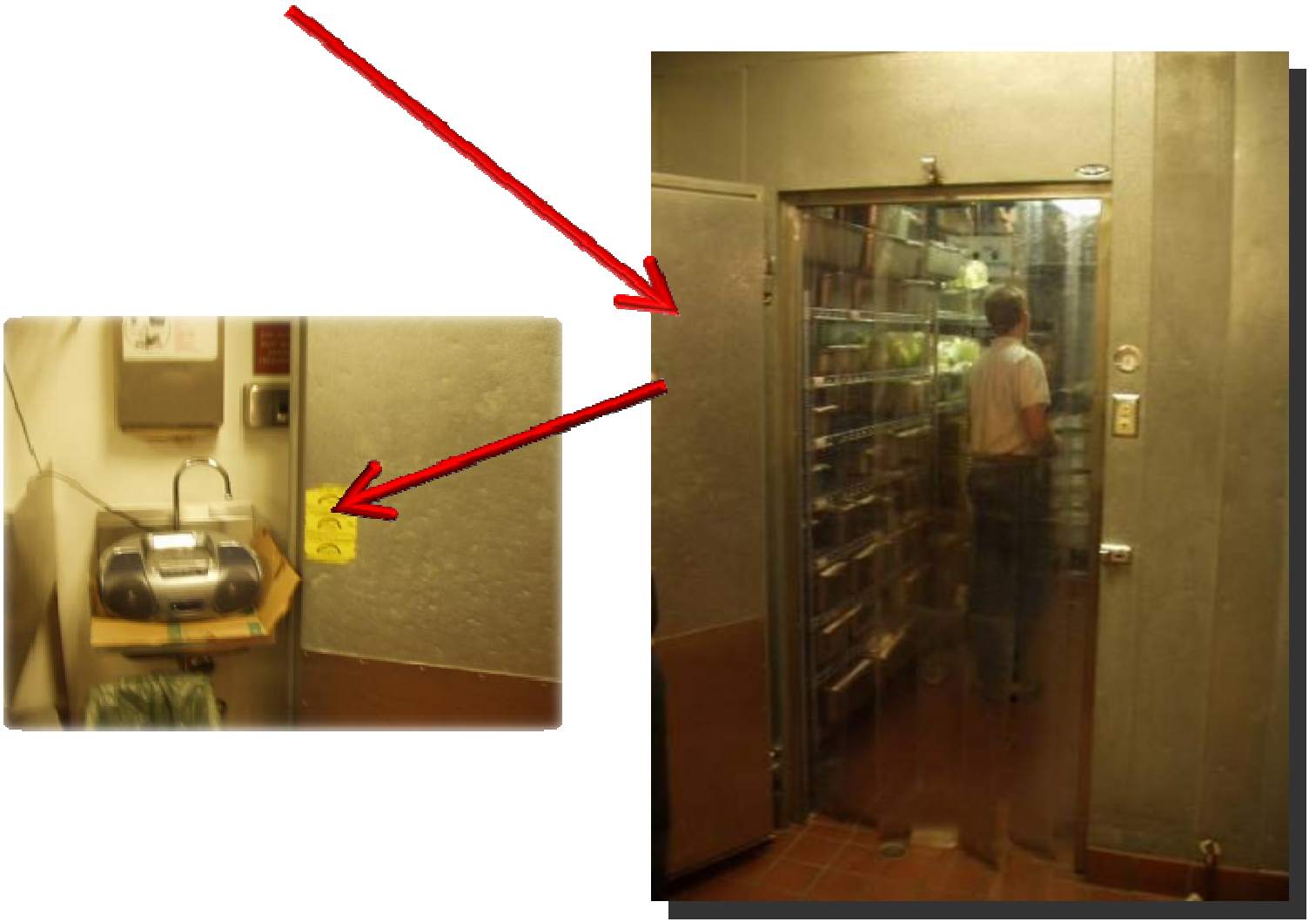
Tip #9:
Install Strip Curtains on Walk-in Doors



or, replace damaged strip curtains!

Install Strip Curtains on Walk-In Boxes

Insurance against propped-open doors



Anecdotal research…

In a QSR application, energy monitoring revealed that strip curtains reduced compressor run time by 33%!

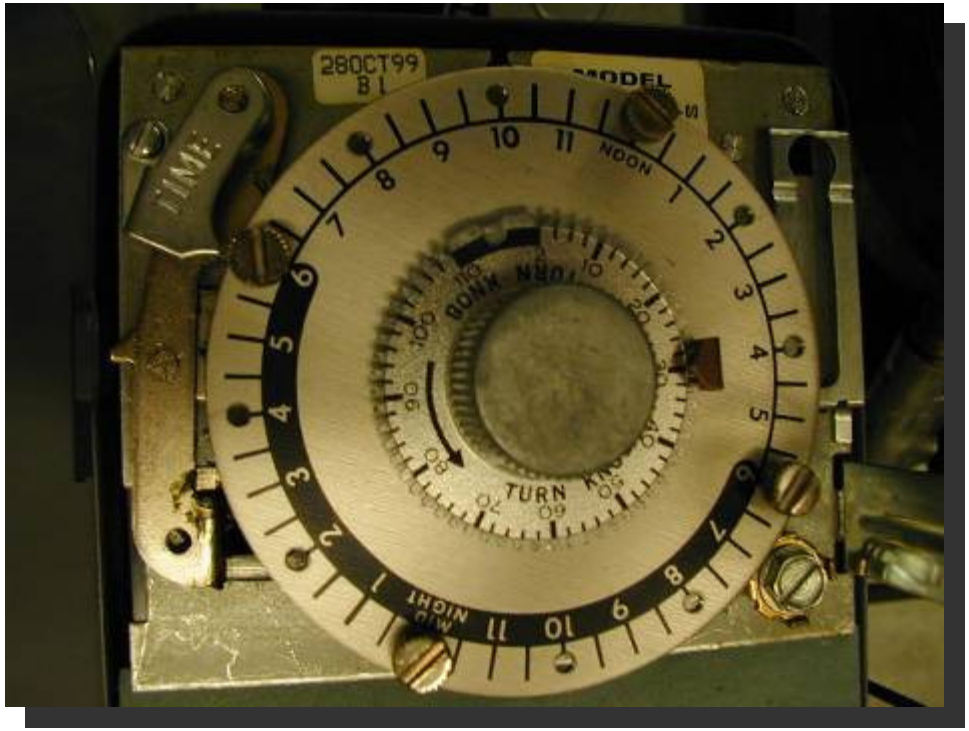
Source: Ed Rembecky, Site Controls Ltd.

Tip #10:
Keep it Calibrated

There are many ways to save energy in a refrigeration system, but properly setting the temperature is the cheapest and easiest.

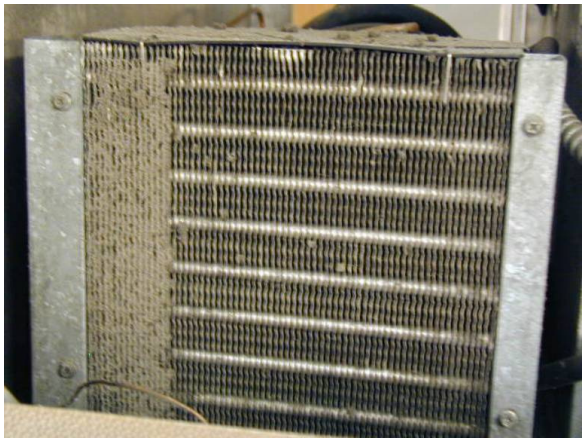
Check and properly set defrost time clocks

- Don’t defrost more often than necessary
- Don’t defrost during the peak energy-use periods – Noon to 6pm



The trick is to defrost as little as possible, reducing defrost energy use, while still keeping frost off the evaporator coils.

Tip #11:
Clean Refrigeration Coils and Make Sure There is Good Air Flow!

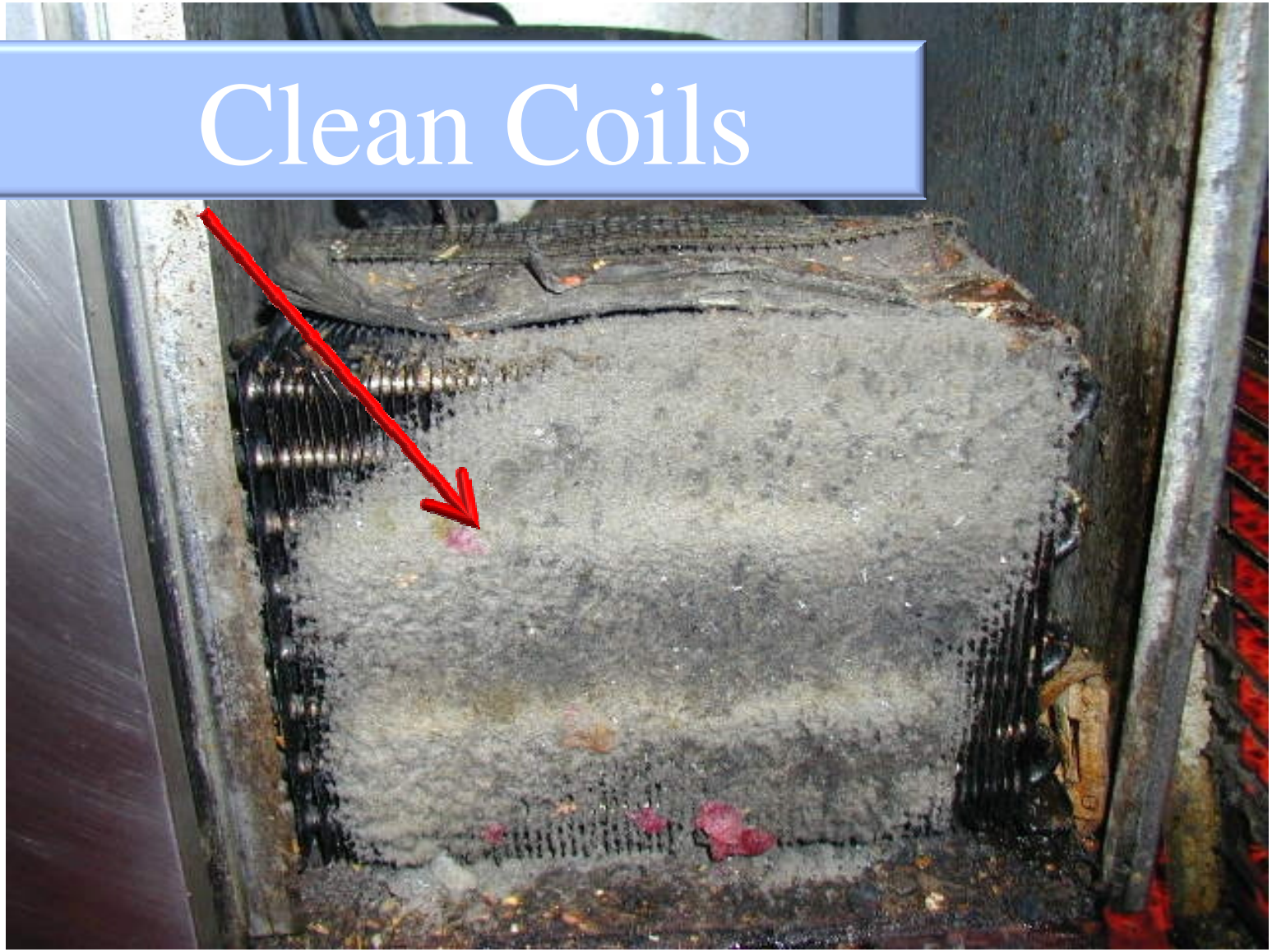


Keep the Heat Flowing

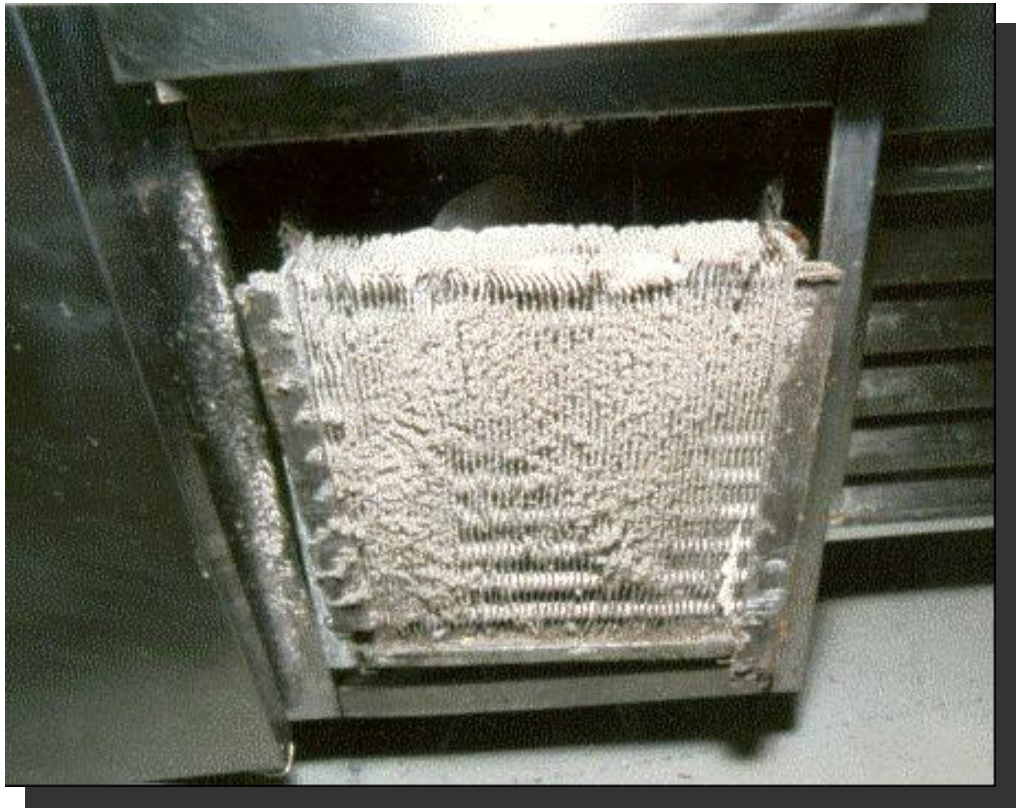
Maintain refrigerator coils:

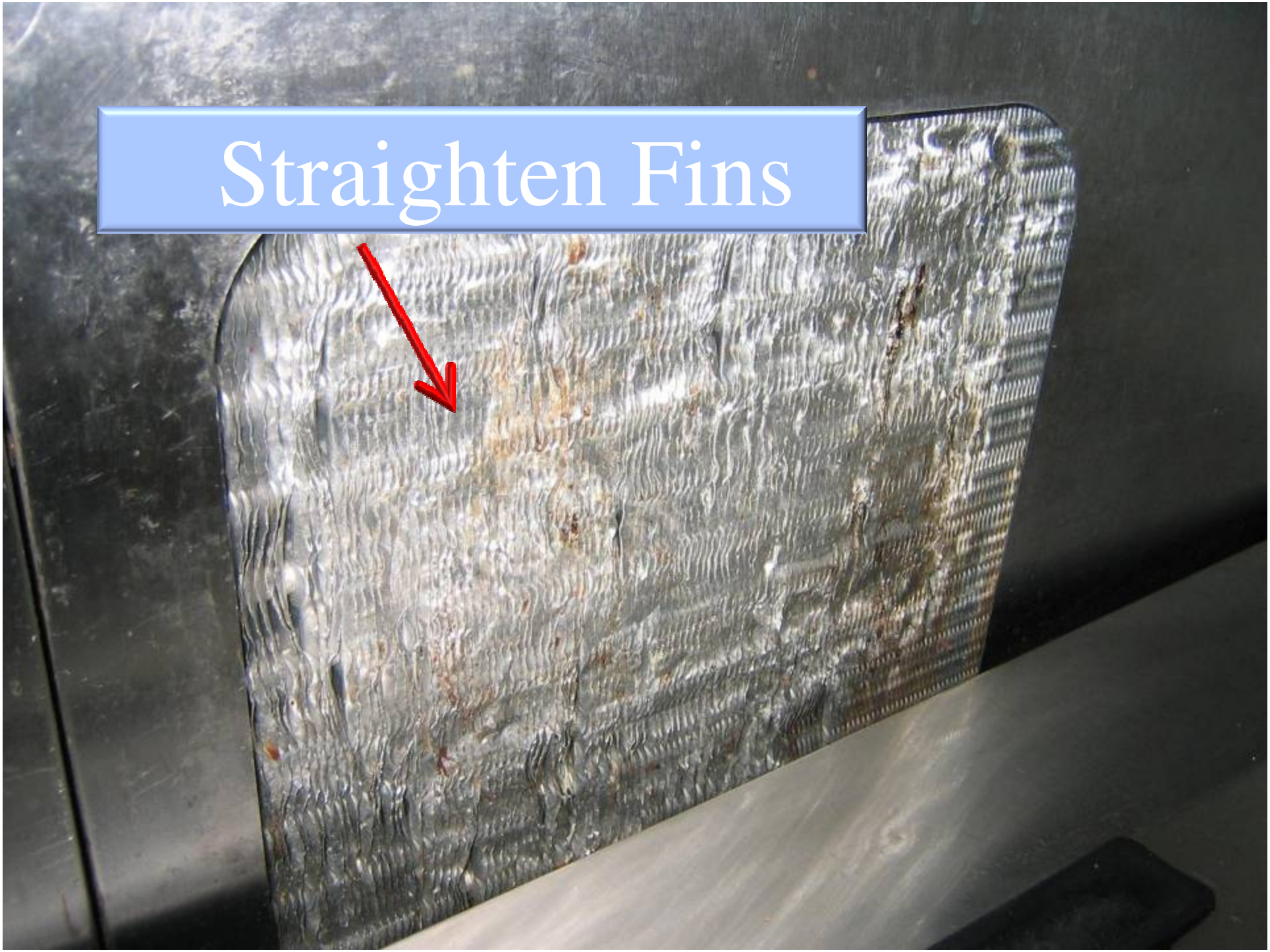
1. Clean evaporator coils,
2. Clean condenser coils,
3. Remove obstructions,
4. Maintain the condensate drain lines

Clean Coils

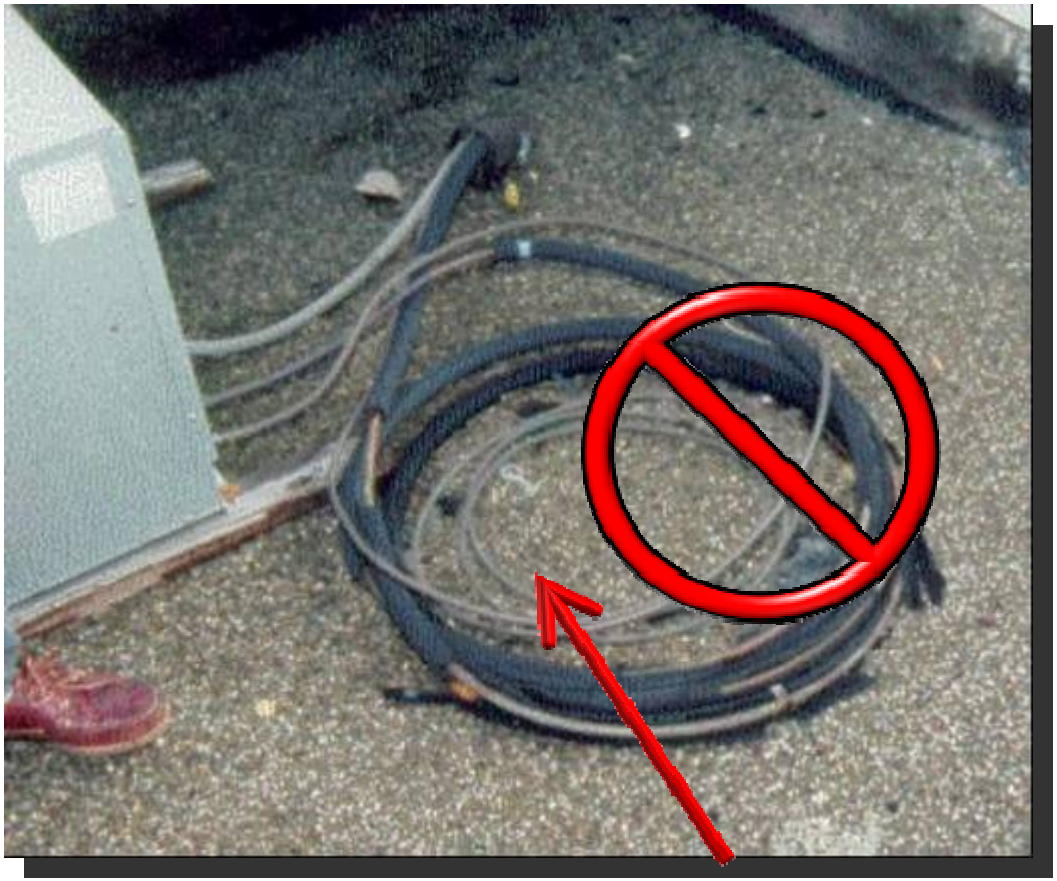


Dirty coils = increased energy + early failure




Straighten Fins

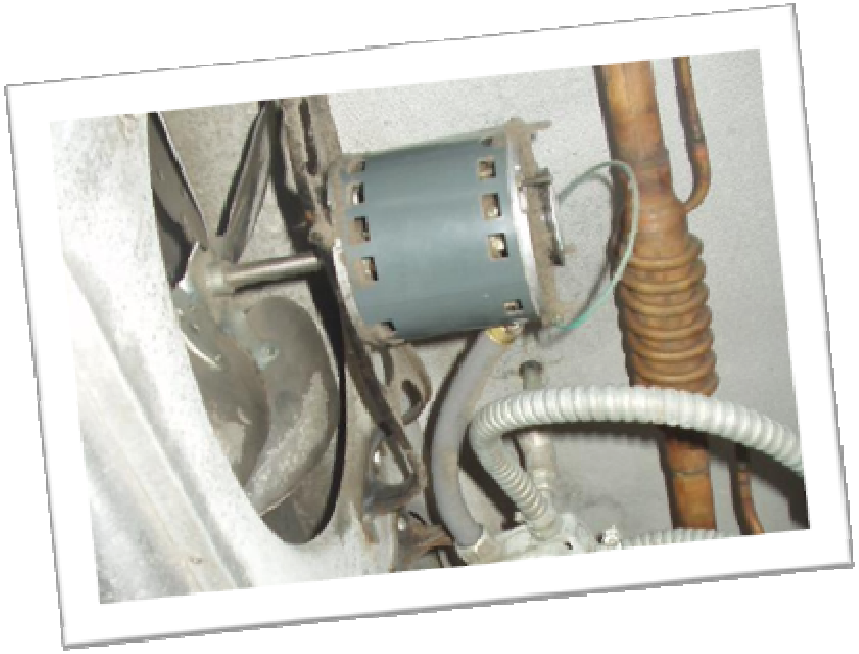
Tip #12:
Insulate rooftop refrigerant lines



These lines full of cold refrigerant are on the hot rooftop

Tip #13:
Replace Inefficient Motors

- The fan motors inside a walk-in spin 24 hours a day. These motors are old school workhorses - reliable but not too efficient.



Tip #14:

Turn off the door heaters on reach-in refrigerators (if possible).

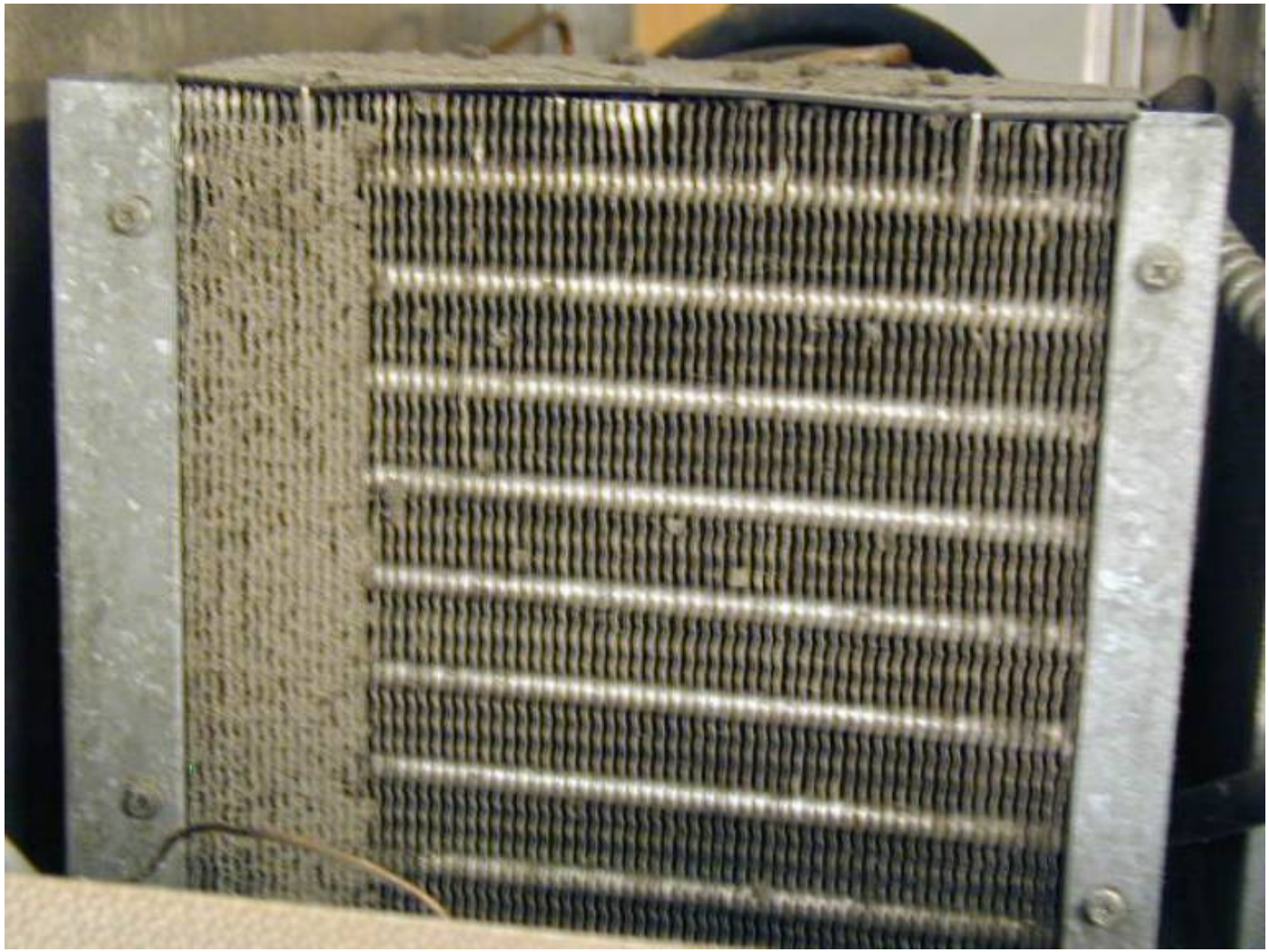
Usually rated at 50 Watts each.

Save about $75 a year per door!

@ $0.15/kWh


Beverage-Air

The difference between dirty and clean:



Tip #15:
Don’t block air flow to the evaporator!


egg beaters

… and remove plastic bags from the rear.

Our favorite find!


R-22

Tip #16:

Purchase Energy Star Labeled Appliances

www.EnergyStar.gov

ENERGY STAR Categories

www.energystar.gov/cfs

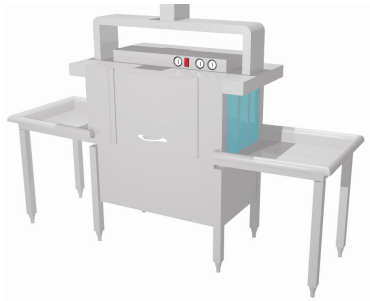
Refrigeration

Hot Holding Cabinets

Fryers

Steamers

Griddles



Dish Machines

Ice Machines

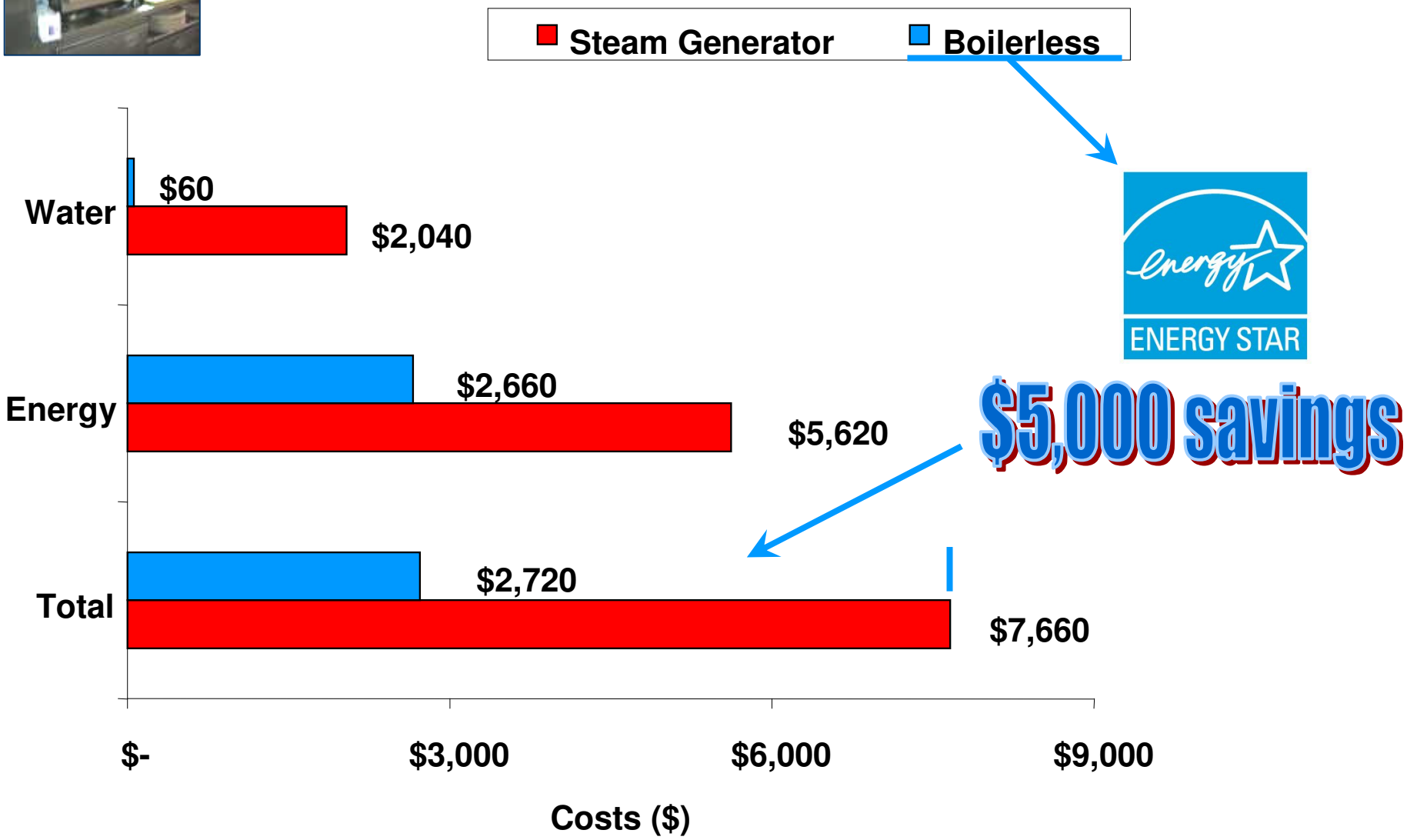
Convection Ovens

New Update – Energy Star Best Practices

Energystar.gov/cfs

www.energystar.gov/ia/business/small_business/restaurants_guide.pdf

Steamer Operating Costs



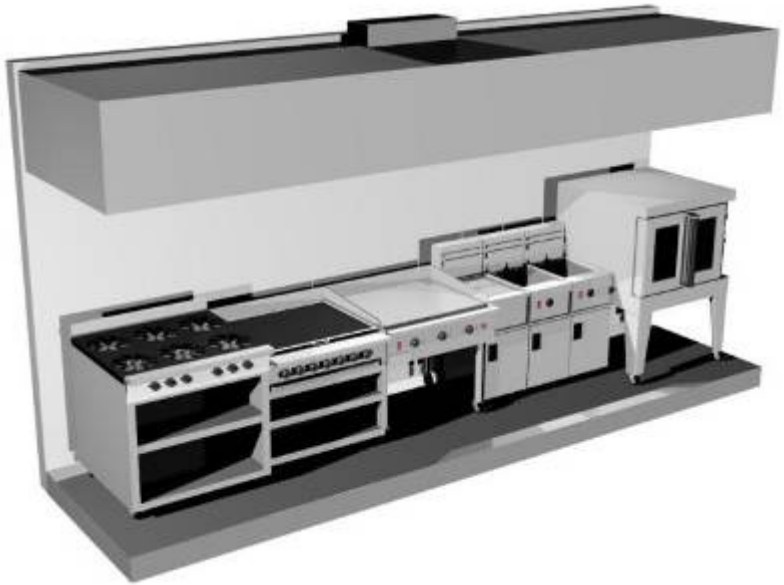
Water @ $2.00 / 100 cf Sewer @ $3.00 / 100 cf Electricity @$0.15 / kWh

Commercial Kitchen Ventilation

Optimize

Rebalance

Turn off when kitchen is closed



Resource: On-line Design Guides

Design Guide 1

Improving Commercial Kitchen Ventilation System Performance

Exhaust Hood Selection & Sizing

This design guide provides information that will help achieve optimum performance and energy efficiency in commercial kitchen ventilation systems by properly selecting and sizing exhaust hoods. The information presented is applicable to new construction and, in many instances, retrofit construction. The audience for this guideline is kitchen designers, mechanical engineers, code officials, food service operators, property managers, and maintenance people. This guide is intended to augment comprehensive design information published in the Kitchen Ventilation Chapter in the ASHRAE Handbook on HVAC Applications as well as *Design Guide No. 2: Improving Commercial Kitchen Ventilation Performance – Optimizing Makeup Air* (previously published by the California Energ... the title *Improv... Ventilation Pe...*

Fundamentals of Kitchen Exhaust 1
The Cooking Factor 1
The Hood Factor 2
The Makeup Air Factor 4
The Design Process 5
QSR Design Example 9
Casual Dining Example 14

Fundamentals of Kitchen Exhaust

Hot air rises! An exhaust fan in the ceiling could remove much of the heat produced by cooking equipment. But mix in smoke, volatile organic compounds, grease particles and vapor from cooking, and a means to capture and contain the effluent becomes necessary to avoid health and fire hazards. While an exhaust hood serves that purpose, the key question becomes: what is the appropriate exhaust rate? The answer always depends on the type (and use) of the cooking equipment under the hood, the style and geometry of the hood itself, and how the makeup air (conditioned or otherwise) is introduced into the kitchen.

burgers. Ovens and pressure fryers may have very little plume until they are opened to remove food product. Open flame, non-thermostatically controlled appliances, such as underfired broilers and open top ranges, exhibit strong steady plumes. Thermostatically controlled appliances, such as griddles and fryers have weaker plumes that fluctuate in sequence with thermostat cycling (particularly gas-fired equipment). As the plume rises by natural convection, it is captured by the hood and removed by the suction of the exhaust fan. Air in the proximity of the appliances and hood moves in to replace it. This replacement air, which must originate as outside air, is referred to as makeup air.

Building codes distinguish between cooking processes that create smoke and grease (e.g., frying, griddling, or charbroiling) and those that produce only heat and moisture (e.g., dishwashing and some baking and steaming operations).

Design Guide 2

Commercial Kitchen Ventilation

Optimizing Makeup Air

This design guide provides information that will help achieve optimum performance and energy efficiency in commercial kitchen ventilation systems. The information presented is applicable to new construction and, in many instances, retrofit construction. The audience for this guideline is kitchen designers, mechanical engineers, food service operators, property managers, and maintenance people. This guide is intended to

Introduction 1
Background 1
Kitchen Ventilation Fundamentals 2
Influence of Makeup Air 5
MUA Recommendations 6
Influence of Other Factors 9
Energy Saving Considerations 6
Design Guide Summary 12
Case Study 13

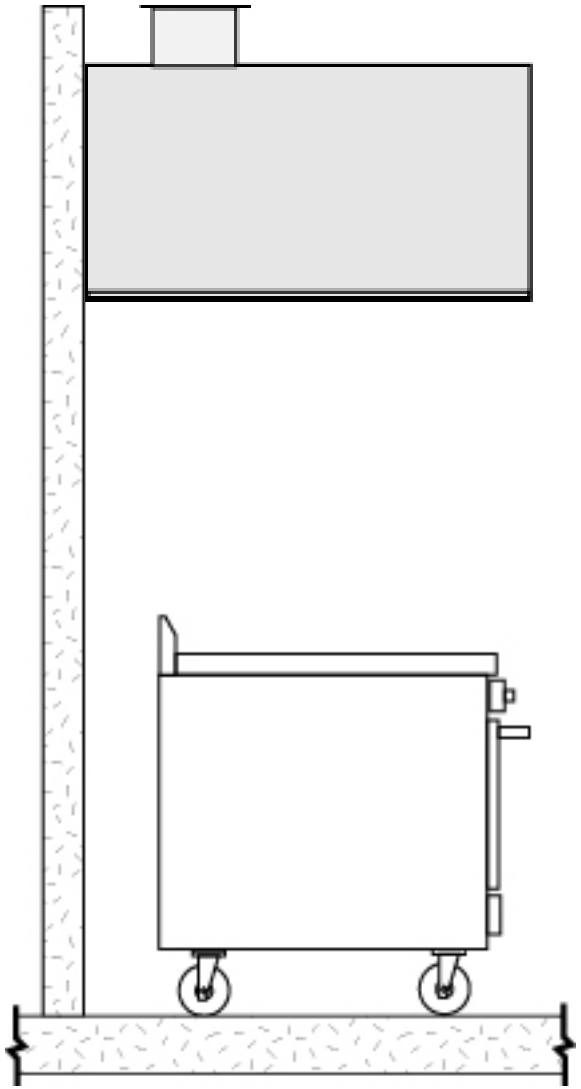
Introduction

An effective commercial kitchen ventilation (CKV) system requires balance—air balance that is. And as the designer, installer or operator of the kitchen ventilation system, you may be the first person called upon to perform your own "balancing act" when the exhaust hood doesn't work. Unlike a cooking appliance, which can be isolated for troubleshooting, the exhaust hood is only one component of the kitchen ventilation system. To further complicate things, the CKV system is a subsystem of the overall building heating, ventilating and air-conditioning (HVAC) system. Fortunately, there is no "magic" to the relationship between an exhaust hood

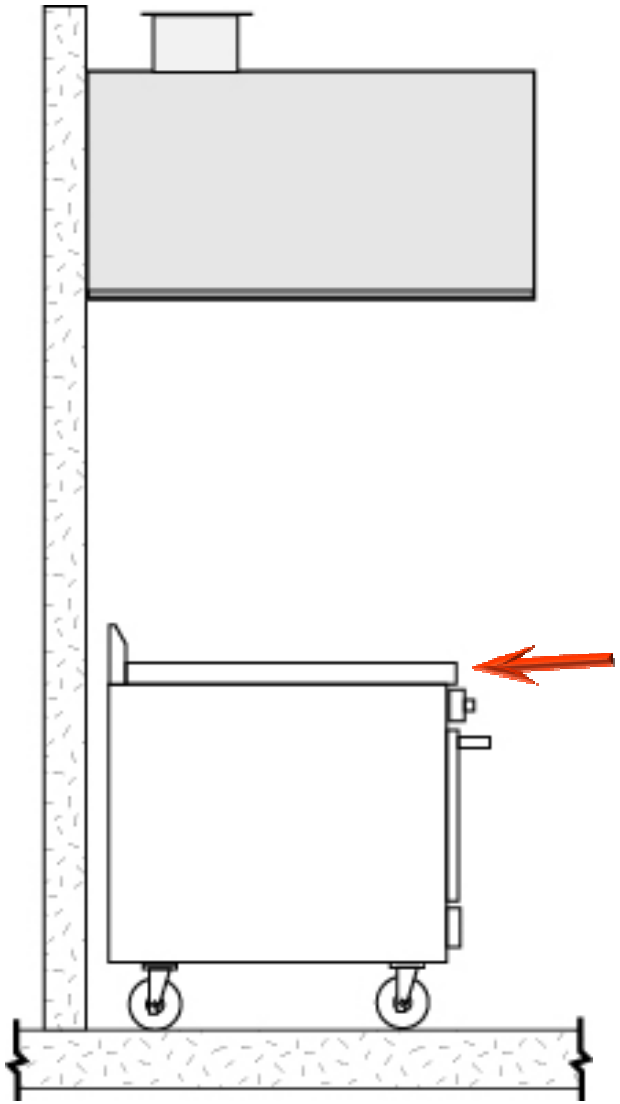
"negative," the hood may not capture and contain (C&C) cooking effluents due to reduced exhaust flow. We have all experienced the "can't-open-the-door" syndrome because the exhaust fan is sucking too hard on the inside of the restaurant. The mechanical design may call for 8000 cubic feet per minute (cfm) of air to be exhausted through the hood. But if only 6000 cfm of outdoor air is able to squeeze in through closed dampers on rooftop units and undesirable pathways in the building envelope, then only 6000 cfm is available to be exhausted through the hood. The exhaust fan creates more suction (negative pressure) in an unsuccessful attempt to pull more air through the hood.

There is no piece of equipment that generates more controversy within the food service equipment supply and design community than the exhaust hood in all its styles and makeup air combinations. The idea that by not installing a dedicated

Optimize the Kitchen Exhaust Hood

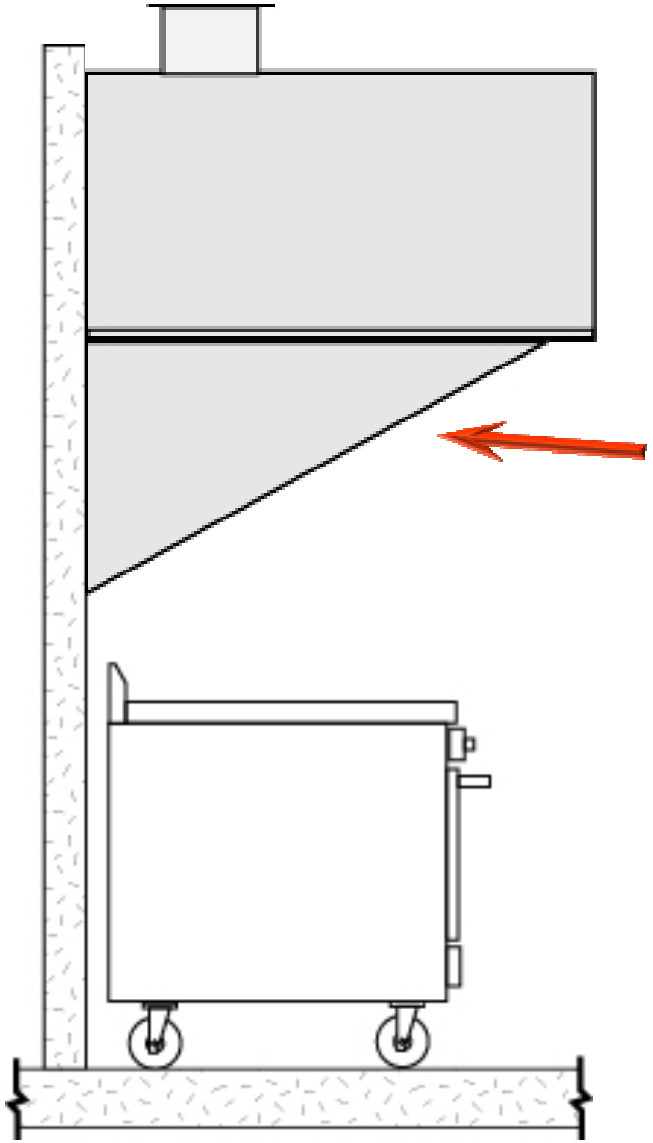


How to keep the smoke and heat in the hood.



Tip #17:

Push Appliances Back



Tip #18:

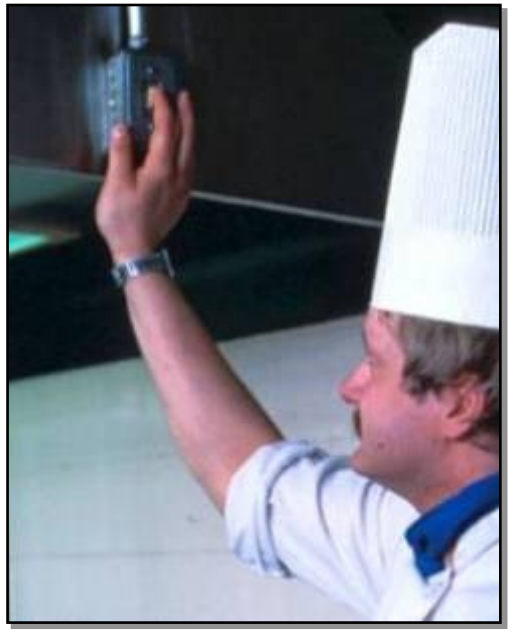
Add Side Panels

Side Panels in Practice

Tip #19:

Turn off kitchen exhaust and make-up air fans when appliances are off!

Save about $500/yr for each hr/day the hood is off (16’ - 20’ hood)



Tip #20:
Turn off loads when possible!

Pay careful attention to kitchen "plug loads". For instance, turn off holding cabinets, coffee machines, conveyor toasters, steam tables, plate and food warmers, and heat lamps when not needed.

Example: 3 coffee warmers = 270 watts!

Turn off dish machine exhaust hood and tank heater when kitchen is closed.

Hood - save $250/yr

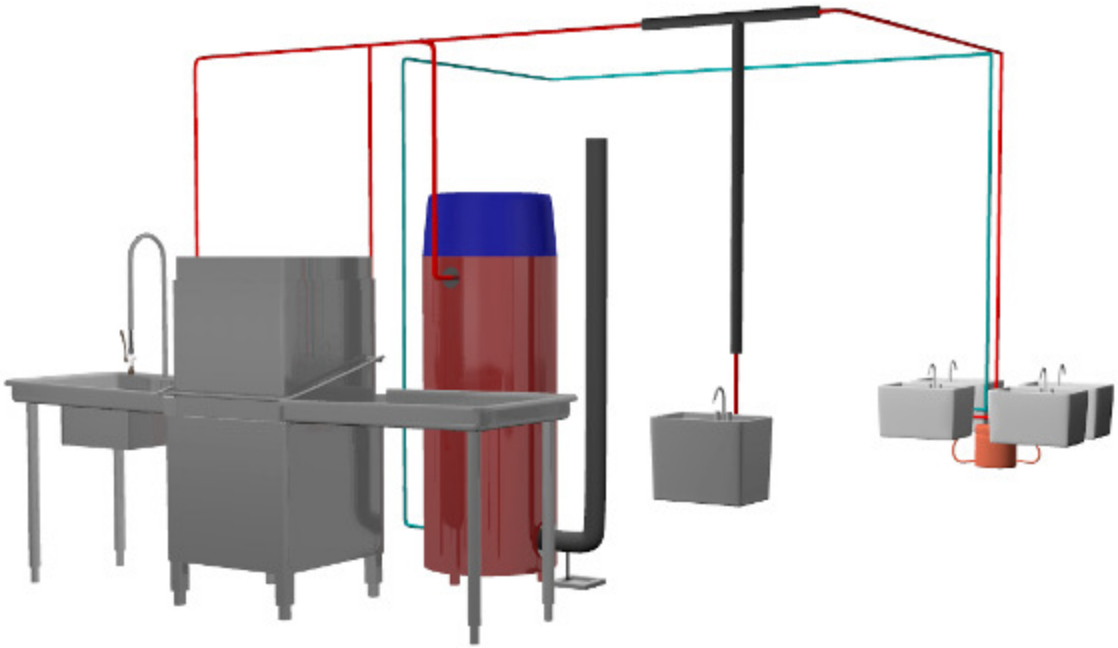
Tank Heater - save $750/yr

@ $0.15/kWh

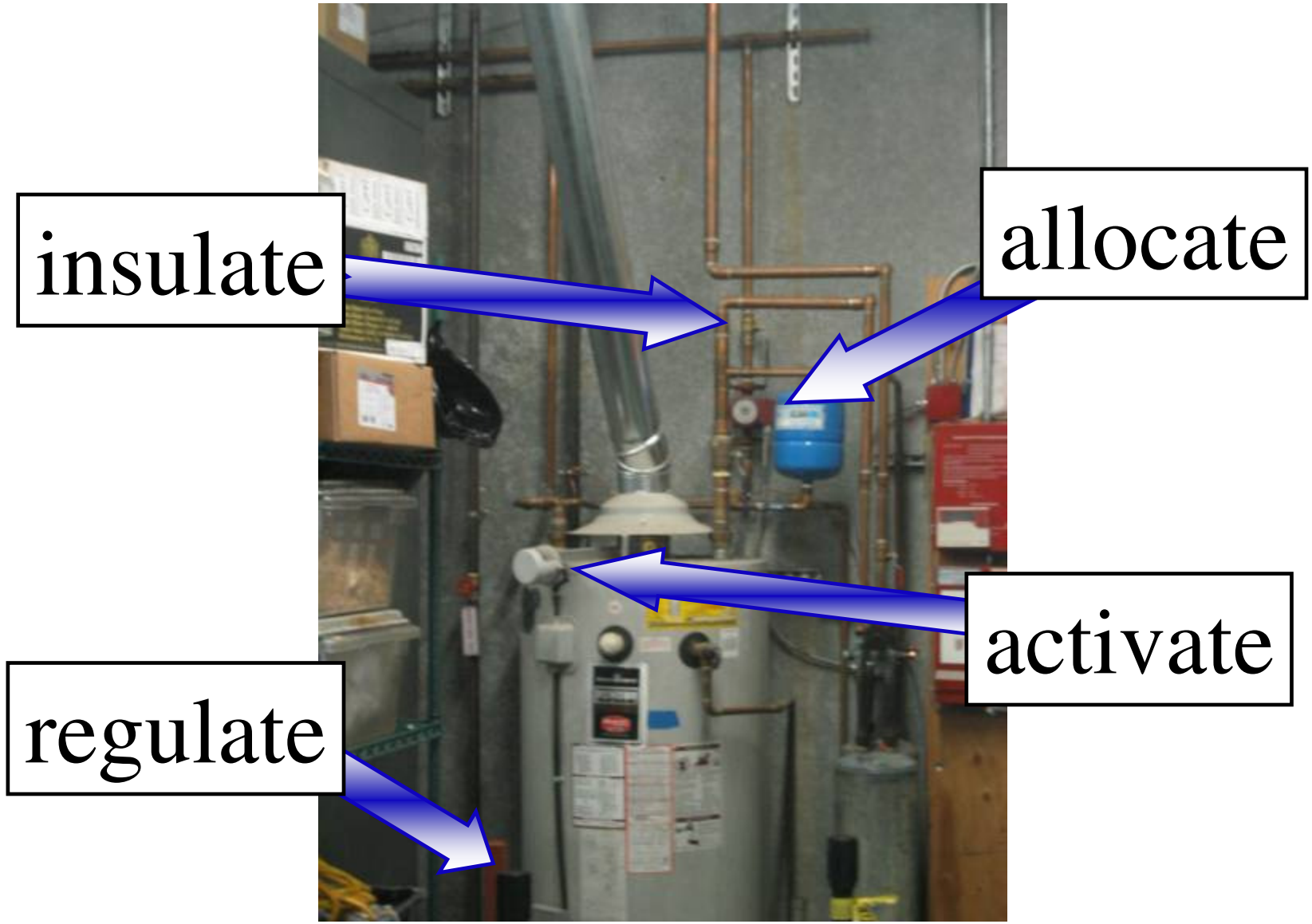
Tip #21:
Fill dishwasher racks to capacity

– Eliminate 10 dish loads a day - save $450/yr

Water Heating



4 Hot Water Heater "Must-Do's"



Tip #22:

Insulate the water lines.

Saves about $4 to $5/year/foot*

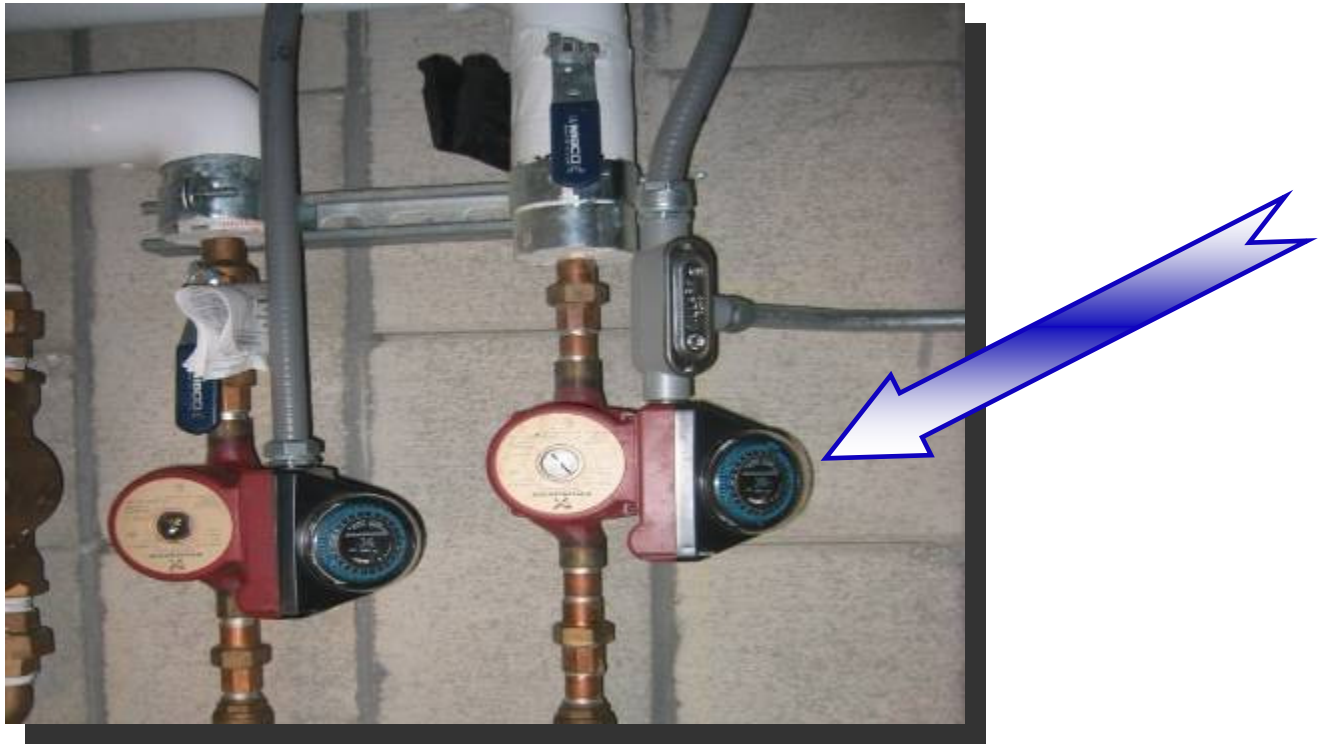
*based on horizontal 1.5 inch pipe, 70° F ambient, indoor installation, 80% efficiency


Bare Hot Water Line

Tip #23:

Allocate the recirc pump operation: use a timer to turn it off at night.

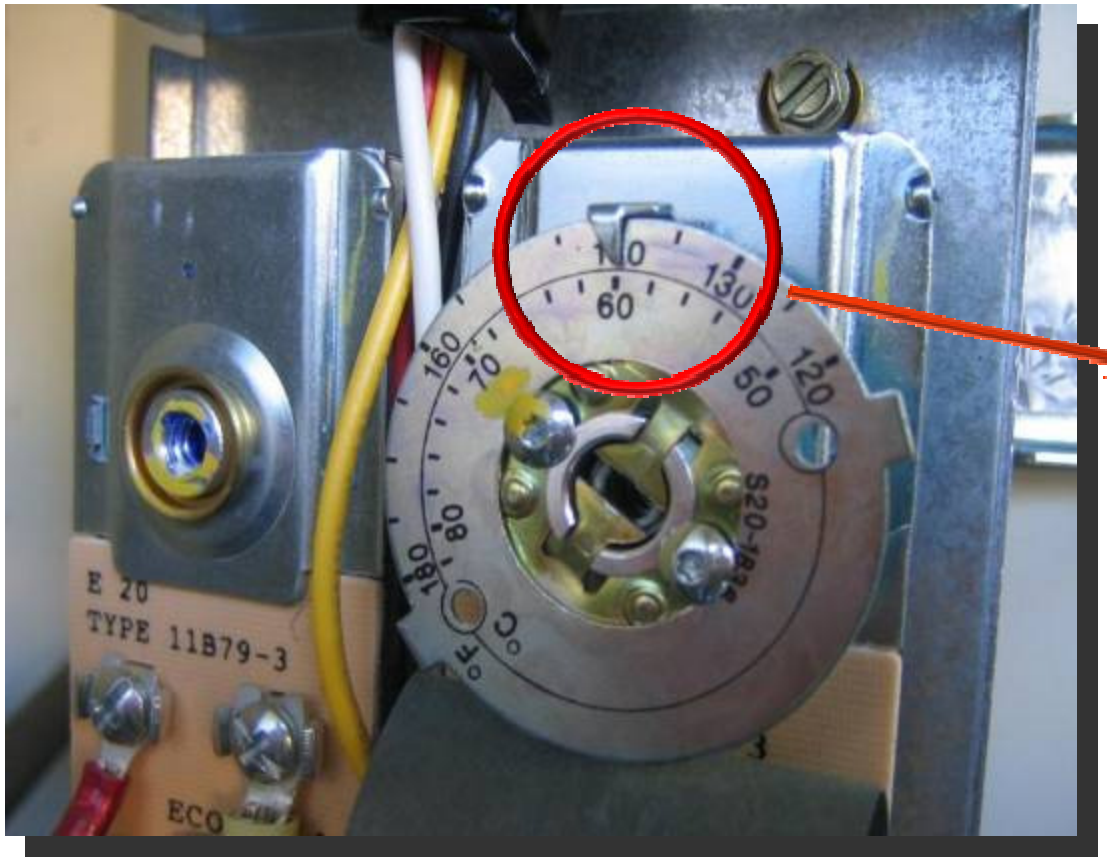
Example savings: $300 a year*



*includes $100 in electric pump energy savings

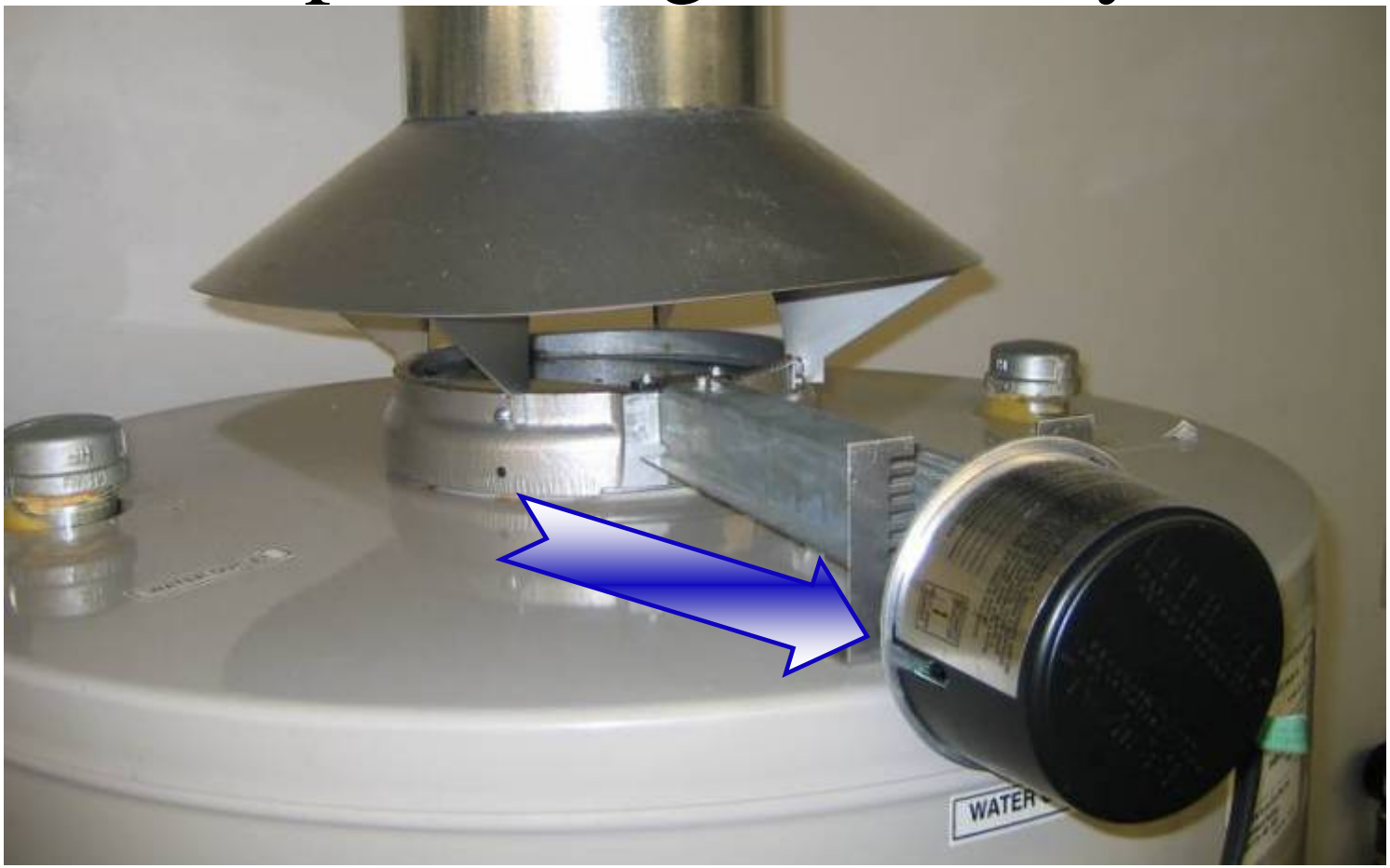
Tip #24:
Regulate the tank temperature by properly setting the thermostat.

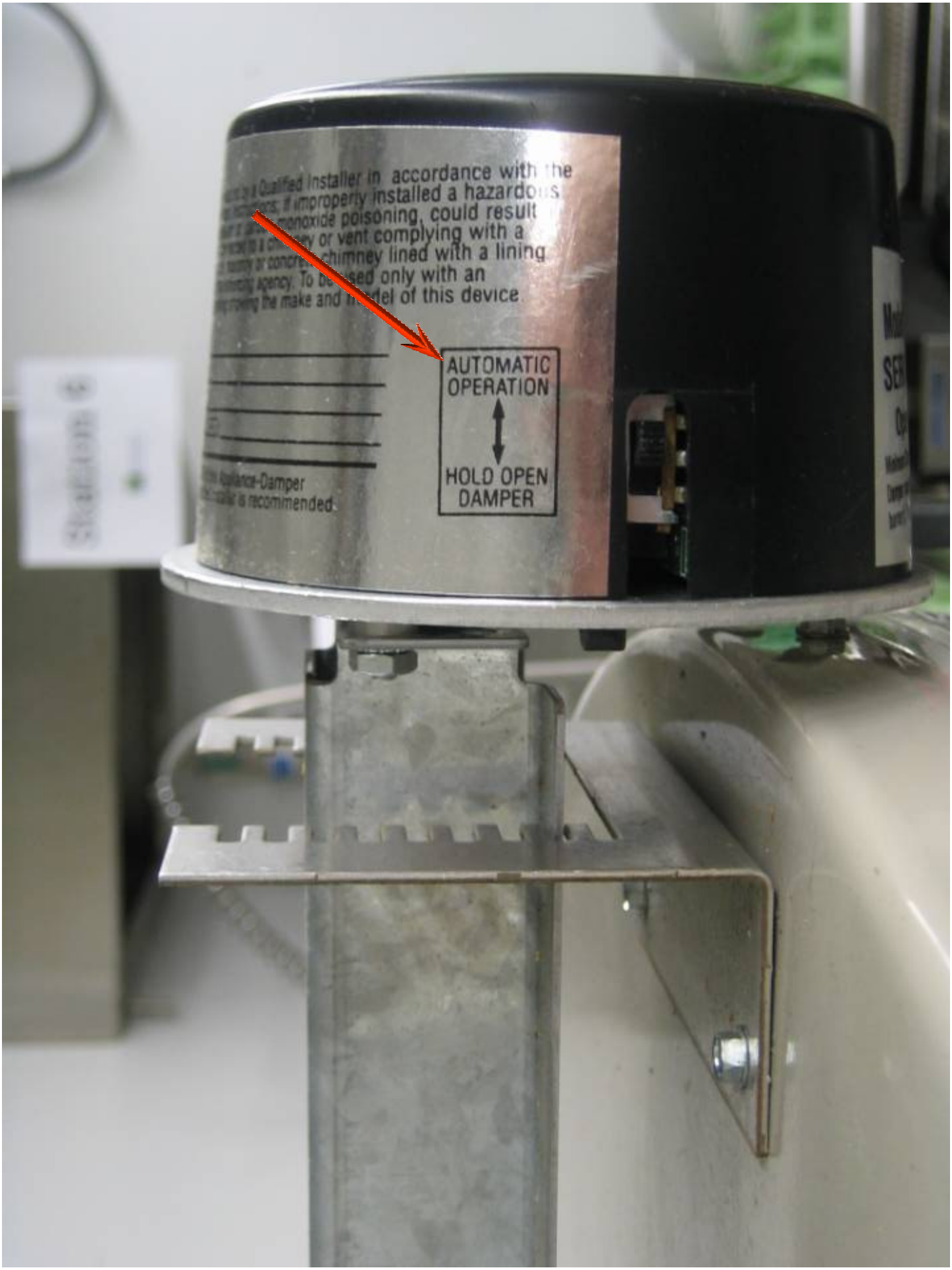
Example savings: $600 a year



Tip #25:
Activate the automatic flue-damper control: turn it on!

Example savings: $300 a year




AUTOMATIC
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