

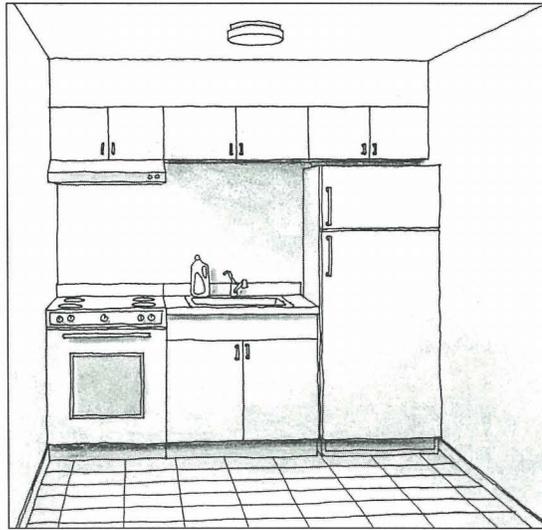
Kitchens

Give special consideration to lighting counters, as this is the primary task area in kitchens. Where possible locate the sink in front of a window for good use of daylighting. Locate luminaires near the areas of greatest use and on both sides of the primary work areas to control glare. Install downlights over the counter 1 to 2 feet from the wall, but avoid locating them over the upper wall cabinets. To minimize shadows, avoid locating the lamp behind the person using the counter. Use under-cabinet luminaires to avoid shadows under overhead cabinets.

Small Kitchen

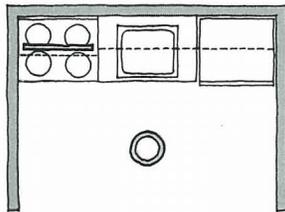
Typical

A ceiling-mounted diffuser containing three 60-watt incandescent A-lamps and controlled by a wall-mounted switch provides ambient lighting. Note that the location of the luminaire can cause shadows to be cast on the countertop. A range-hood luminaire provides lighting for cooking.



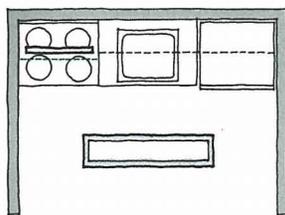
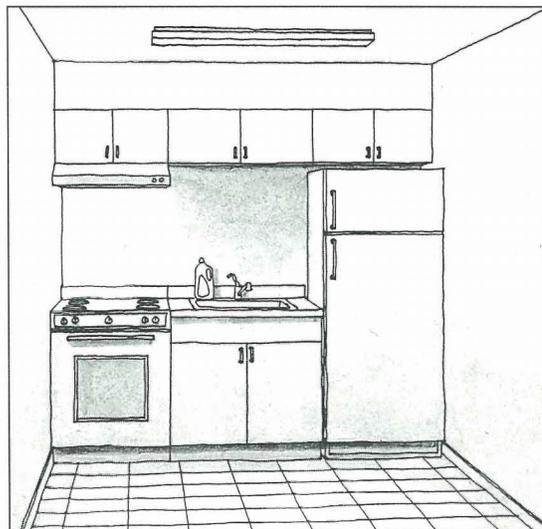
Replace lamps

Replace the A-lamps with three 52-watt halogen A-lamps, or use electronically ballasted 18-watt screwbase compact fluorescent lamps. If the luminaire is fully enclosed, check the fit of the replacement lamps.



Replace luminaires

To reduce annual operating cost and to enjoy higher light output, install a ceiling-mounted diffuser containing two 32-watt, 4-foot T8 RE730 linear fluorescent lamps and one electronic ballast. Retain the wall-mounted switch.



Annual Operating Cost at \$0.10 per kWh



CFL = compact fluorescent lamp
For all of the lamps, assume 3 hours of use per day and 2 hours per start.

Medium Kitchen 1



Typical

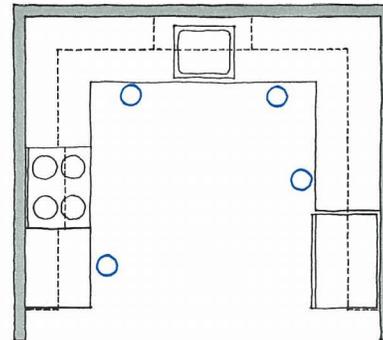
Four recessed downlights, without reflectors, each containing one 100-watt incandescent A-lamp, provide ambient lighting and lighting for the counter. One wall-mounted switch controls the downlights.

Replace lamps

Replace each A-lamp with a 50-watt halogen PAR30 flood lamp.

Replace controls

For the typical design, replace the wall-mounted switch with a manual-on/manual-off motion detector.



Replace luminaires

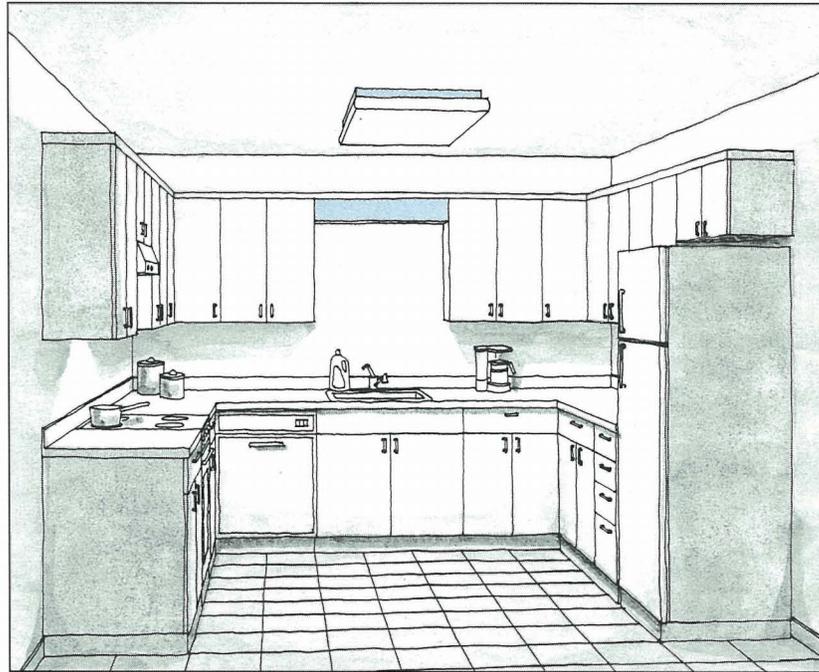
If lower light output is acceptable, modify each of the recessed downlights with a conversion kit that houses a reflector, a magnetic ballast, and two 13-watt compact fluorescent twin-tube lamps.

Annual Operating Cost at \$0.10 per kWh



For all of the lamps, assume 3 hours of use per day and 2 hours per start. The motion detector factor is 70 percent.

Medium Kitchen 2

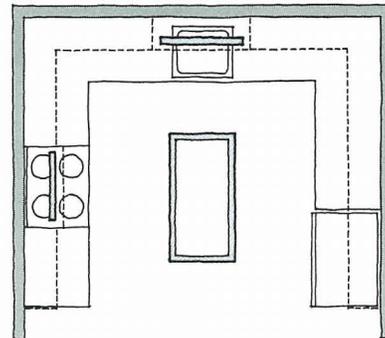


Typical

A ceiling-mounted diffuser containing four 40-watt, 4-foot T12 cool white linear fluorescent lamps and two magnetic ballasts provides ambient lighting. Task lighting for the sink is provided by one under-cabinet luminaire containing two 20-watt, 2-foot T12 cool white linear fluorescent lamps and one magnetic ballast. The hood of the stove contains a luminaire. The ceiling and under-cabinet luminaire are controlled separately by two wall-mounted switches.

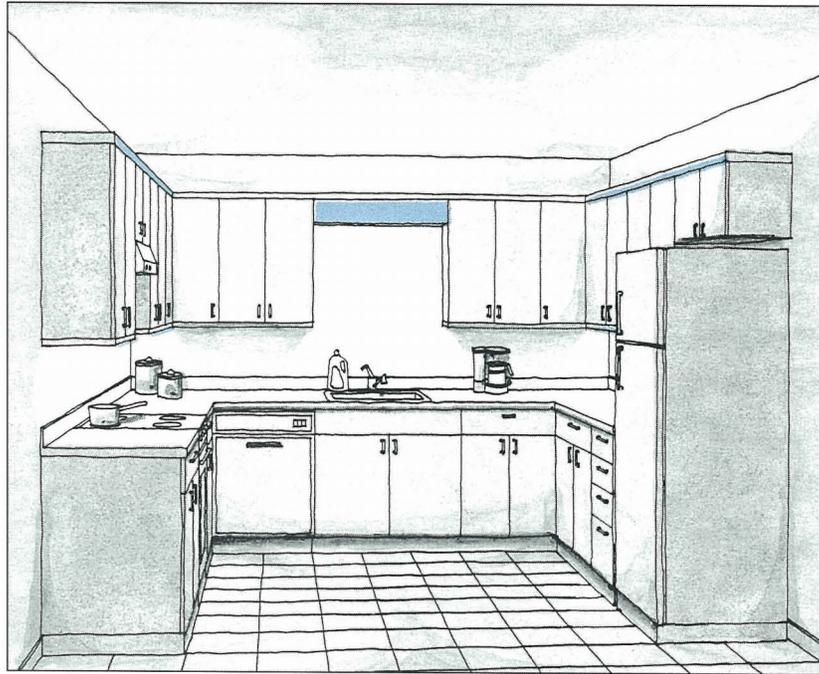
Replace lamps

Replace the lamps with 34-watt, 4-foot T12 RE730 and 20-watt, 2-foot T12 RE730 linear fluorescent lamps to provide better color and slightly lower annual operating cost.



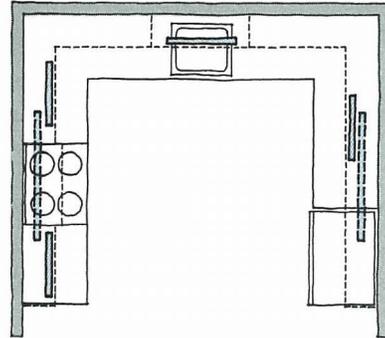
Replace luminaires

Replace the existing luminaire with a similar luminaire that houses four 32-watt, 4-foot T8 RE730 linear fluorescent lamps and one electronic ballast. Optionally, if a lower light output is acceptable, install a luminaire that contains only two or three lamps. Replace the under-cabinet luminaire with a similar luminaire that houses two 17-watt, 2-foot T8 RE730 linear fluorescent lamps and one electronic ballast. If the same number of lamps is used, it may not be necessary to install a new luminaire. It will, however, be necessary to install a new ballast to operate the T8 lamps. This must be done by an electrician, or someone qualified to perform electrical wiring.

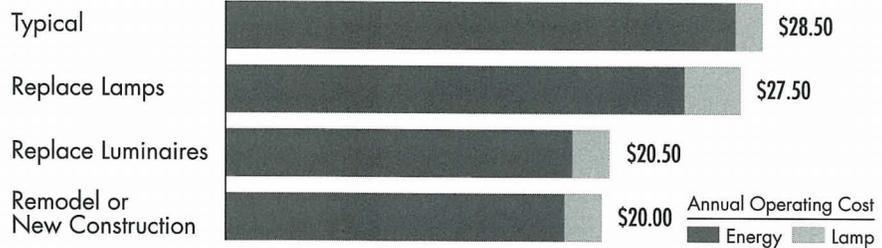


Remodel or new construction

To create a different light distribution pattern, two coves, each containing one 32-watt, 4-foot T8 RE730 linear fluorescent lamp and one electronic ballast, provide uplighting and ambient lighting for the kitchen. Three under-cabinet luminaires and one valance over the sink each containing one 17-watt, 2-foot T8 RE730 linear fluorescent lamp and one magnetic ballast provide lighting for the counter. The valance is controlled by a wall-mounted switch; the under-cabinet luminaires have luminaire-mounted switches. The cove luminaires are controlled separately by two wall-mounted switches.

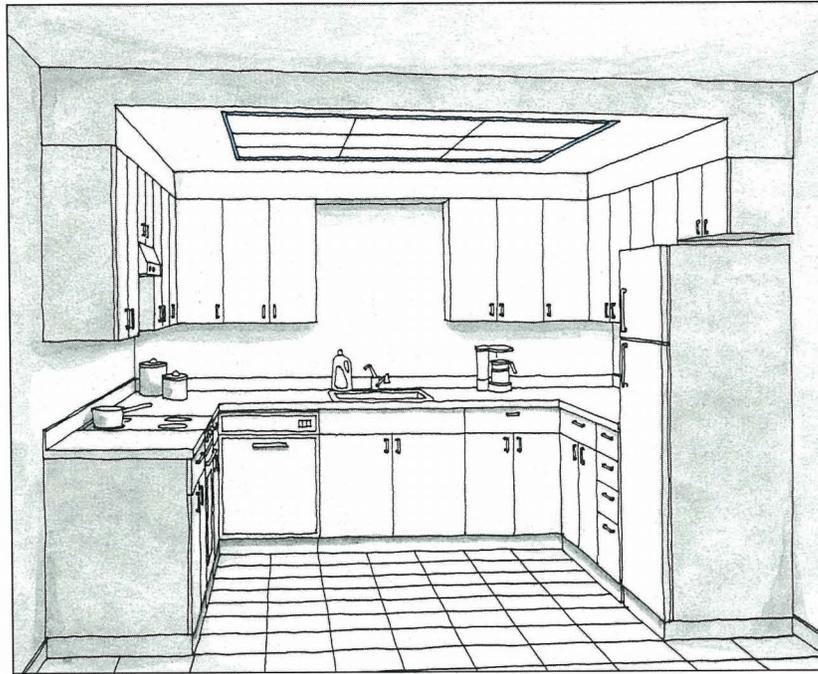


Annual Operating Cost at \$0.10 per kWh



For all of the lamps, assume 3 hours of use per day and 2 hours per start. The luminaire in the range hood is not included in the analysis.

Medium Kitchen 3

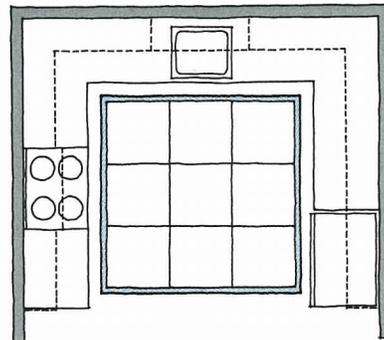


Typical

Eight 40-watt, 4-foot T12 cool white linear fluorescent lamps with four magnetic ballasts provide the ambient lighting from this luminous ceiling. One wall-mounted switch controls all of the lamps. Some installations may have eight magnetic ballasts, one for each lamp.

Replace lamps

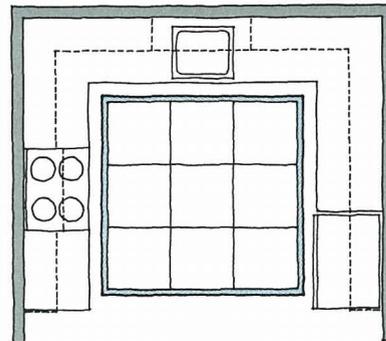
To improve color and slightly lower the light output, replace the lamps with 34-watt, 4-foot T12 RE730 lamps. If the space is overlit and each lamp has its own ballast, consider removing four of the lamps, and replacing the other four with 40-watt, 4-foot T10 lamps.





Replace luminaires

To improve the efficiency of the luminous ceiling, paint the ceiling cavity white to increase reflectance, and clean or replace old diffusers. Replace the lamps with eight 32-watt, 4-foot T8 RE730 lamps. Replace the magnetic ballasts with electronic ballasts. Optionally, wire the lamps to two wall-mounted switches so that either four or eight of the lamps can be switched to give two levels of light output. Optionally, use four dimmable electronic ballasts and one wall-mounted dimmer.



Replace luminaires

If the space is grossly overlit, replace the lamps with four 32-watt, 4-foot T8 RE730 lamps with electronic

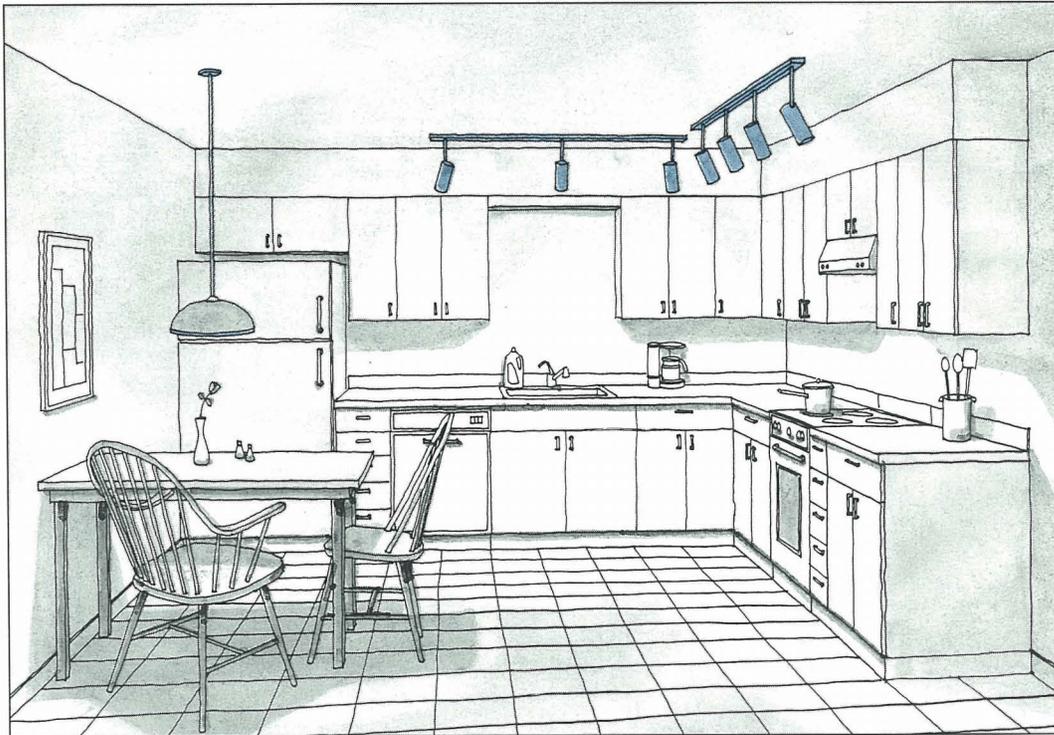
ballasts, controlled by one wall-mounted switch. This design gives significantly less light output than the original design, but it is probably sufficient and perhaps more visually comfortable for ambient lighting. Under-cabinet luminaires may be needed to light the counters.

Annual Operating Cost at \$0.10 per kWh



For all of the lamps, assume 3 hours of use per day and 2 hours per start.

Large Kitchen



Typical

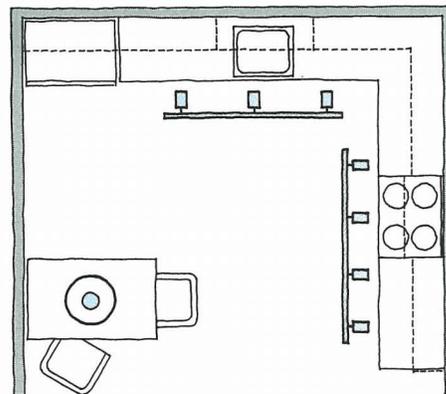
Seven ceiling-mounted track heads and one suspended downlight, each containing one 75-watt incandescent A-lamp, provide ambient lighting and lighting for the counters. Two wall-mounted switches control the two types of luminaires.

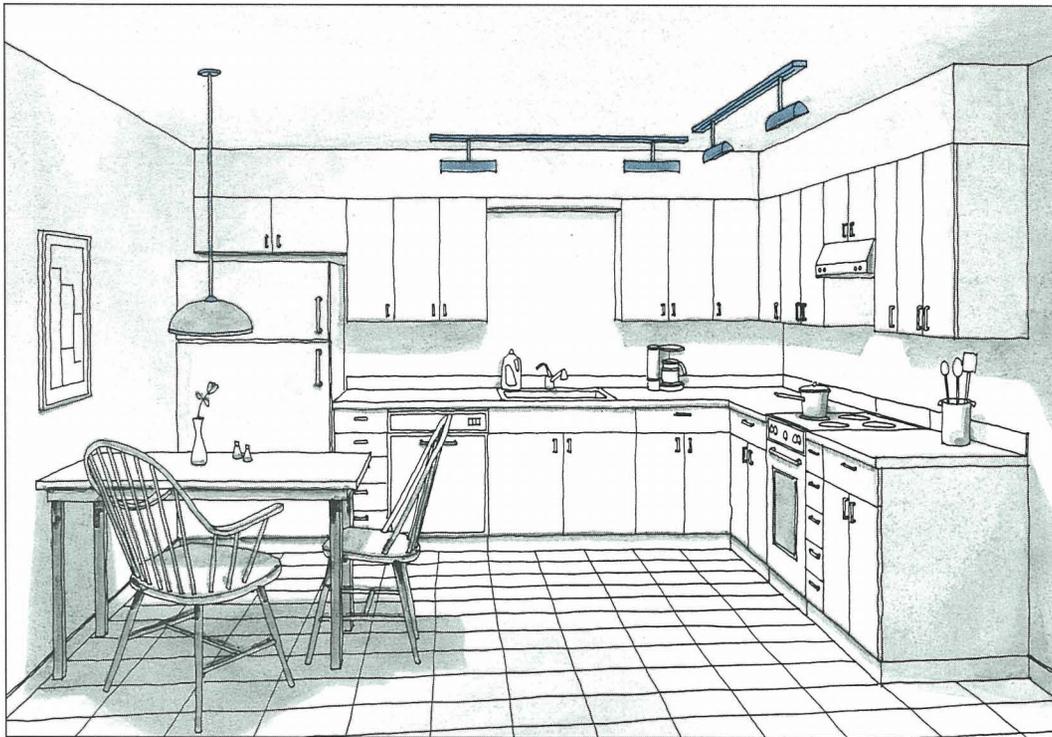
Replace lamps

If lower light output is acceptable, replace the A-lamps in the track heads with 60-watt halogen A-lamps. Optionally, for track heads that are designed for R-lamps, replace the lamps with 50-watt halogen PAR-lamps. Replace the A-lamp in the suspended downlight with one electronically ballasted 18-watt globe screwbase compact fluorescent lamp if a slightly lower light output is acceptable and any existing diffuser can be removed.

Replace controls

For the typical design, replace the switch for the track heads with a dimmer or, optionally, with a motion detector.

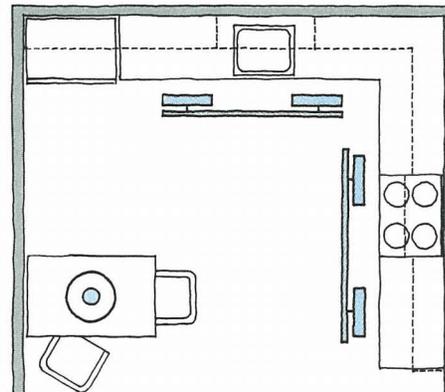


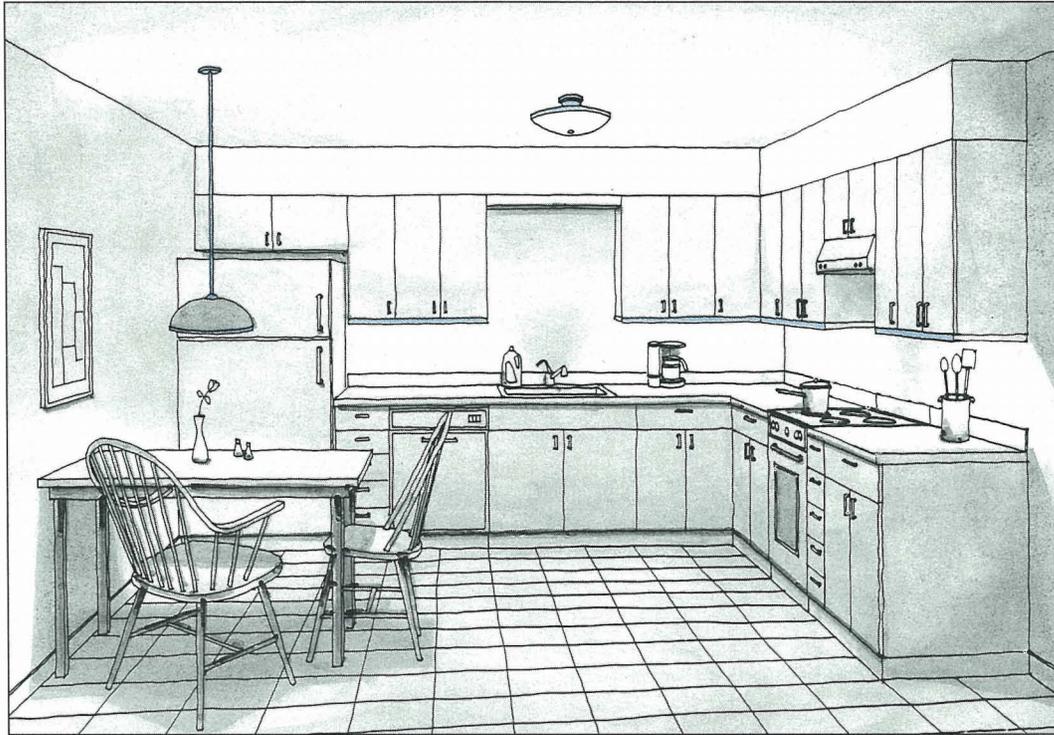


Replace luminaires

Without altering the layout of the tracks, replace the existing seven track heads with four track heads, each containing one 39-watt, 16.5-inch fluorescent twin-tube lamp and one electronic ballast. Replace the A-lamp in the suspended downlight with one electronically ballasted 18-watt globe screwbase compact fluorescent lamp if a lower light output is acceptable and any existing diffuser can be removed. Control both types of luminaires with wall-mounted switches.

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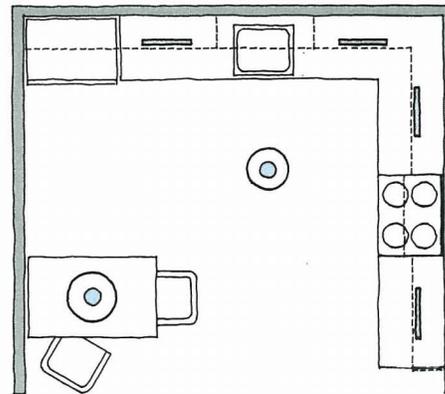




Remodel or new construction

This design offers a different light distribution pattern, especially on the counters where light is provided by four under-cabinet luminaires, each containing one 13-watt, 21-inch warm white T5 linear fluorescent lamp and one magnetic ballast. One ceiling-mounted diffuser and one suspended downlight each containing three 13-watt compact fluorescent twin-tube lamps and one magnetic ballast provide ambient lighting.

The ceiling-mounted luminaires are controlled by a wall-mounted switch and the T5 lamps are controlled by one manual switch or optionally by switches mounted on each luminaire.



Annual Operating Cost at \$0.10 per kWh



For all of the lamps, assume 4 hours of use per day and 2 hours per start. Lamps with dimmers are dimmed 50 percent of the time they are operated, to 50 percent light output as perceived by the human eye; the other 50 percent of the time, they are operated at full light output.