

Mise-en-Place: What We Can Learn About Kitchen Design from Commercial Kitchens

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Mise-en-place (or Mis-en-place: literally "put in place") is a French culinary term for having everything at hand to prepare a meal before you start cooking. In a commercial kitchen where a lot of appetizing, attractive and savory meals have to be prepared and assembled quickly and efficiently, everything must not only be ready, but within easy reach of the chef.



Everything stored within easy reach of the chef's work station in a commercial kitchen. Note how the countertops are set at different heights to fit the tasks to be performed. Counter tops are often adjustable to precisely fit the busy cooks.

"*Within easy reach*" is the critical concept. It does no good if all of the ingredients for a meal are fully prepared — but across the room. A busy chef does not do much walking. Everything he needs is within his or her immediate reach standing in one place — movement is minimized, efficiency and speed maximized.

Everything in a well-implemented commercial kitchen is designed around the mise-en-place concept — something chefs learn early on in culinary school. Each work station contains everything needed to prepare a meal, all within immediate sight and reach of the chef. This means, among other things, that each area may have its own refrigerator, waste containers, sink, cutting area, and assembly counter and warmer.

A lot of this structure is just not needed in a home kitchen. After all, we do not need to prepare any one of twenty entrees, fourteen appetizers or thirty-one desserts at a moment's

notice. So our kitchen does not need to be quite so efficient or quite as well organized (unless it's Thanksgiving, Christmas or someone's birthday). But while we do not need and probably cannot afford all of the efficiencies of a modern professional kitchen, many of the

features of a busy commercial kitchen can easily find a welcome place in our home kitchens.

The Arc of Reach

You may not know that you have an *arc of reach*, but you do. Arc of reach refers to how far a person can reach in one direction while standing in one place without bending, stooping, twisting or stretching. You can easily determine your own arc of reach.

Primary and Extended Arcs of Reach

The Arc of Reach of a



standing 5' 6" woman (Blue). Her most comfortable reach encompasses the counter top, the lower shelves of upper cabinets and the top drawers of lower cabinets. The most frequently used items should be stored within this arc.

She can extend her arc of reach (buff) by flexing, bending, stooping and standing on tip-toe while standing in one place. Store less frequently used items in this area

- Standing in front of your kitchen sink, you can probably touch the wall in front of you. This is your forward reach, about two feet.
- Extend your arm out to one side to define the limit of your side reach. For most of us, about 2-1/4 feet. Multiply that by two and add the width of your body (about 18" unless you're Arnold Schwarzenegger) and you get about 6-1/2 feet. This is the extent of your side arc of reach.
- Reach as far as you can over your head with your heels on the floor. This is your upper reach — usually your height plus 18".
- Finally, your lower reach ends about 20" above the floor — just above your knee.

You have just defined your *primary arc of reach*. This is the zone you can reach easily without bending, stooping, leaning, stretching or stepping. Notice that as you reach higher or lower your outward reach decreases. The farthest outward reach (forward or to the side) is at shoulder level. At the highest and lowest points of your arc of reach, there is no outward reach at all.

You can extend your reach by flexing your body. If you stand on tip-toe, you can reach higher, stooping or bending lets you reach lower and farther forward, and so on. This is your "extended arc of reach". Take one step left, right or back and you can increase your reach even farther. This is your "tertiary" arc of reach.

Your arc of reach defines your *primary storage zone*. For maximum economy of movement, everything you use frequently should be within this zone. Your *secondary storage zone* is your extended arc of reach. Implements you use not quite as frequently should be located within this area. Everything else is tertiary storage. You have to walk to get these items so they should be things rarely used for the particular task.

OK, now we understand arc of reach, let's see how the concept applies in a home kitchen.

The Right Countertop Height

If after many hours of preparing holiday meals, you feel like someone has been beating on your lower back with an ball bat, odds are very good your countertops are too low.

When standard kitchen dimensions were researched in the 1930s, Americans were nearly 1" shorter than they are today. The standard 36" counter top height just does not fit us any longer. If it ever did.

The standard counter top height is almost an "iron rule" in kitchen design. It is simply assumed, and rarely reconsidered. The kitchen design literature is virtually silent about how to determine proper counter height (except when designing "accessible" or "universal" kitchens for users confined to wheelchairs). The nice thing about having a standard height is that everyone can manufacture to that height with the guarantee that the cabinets, range, dishwasher and other appliances affected by counter height will fit properly. The un-nice thing is that a counter that is too high or too low can be hellish to work at.

Common sense tells us that if a 36" height is perfect for a 5'-7" individual, it will be too high for a 5'-0" cook and too low for someone 6'-4". In other words, there are very few average Americans who perfectly fit the standard 36" counter top height. The odds of you being one of them are pretty slim.

Forget the 36" standard. Fit your counter tops to your own height. Start with this rule:

Your counter top should be high enough so that with your hands placed flat on the counter, your elbows are bent about 45 degrees.

Figure your best counter top height by starting with a flat surface about 32" high. Then using books and magazines build up until the counter top height feels just right. If it's too high, start a little lower. In most households this places the counter top between 34" to 38" high — difficult to accomplish with manufactured cabinets that are relentlessly 36" and only 36" high — no exceptions except at a very high up-charge. It can be done, but it takes a little planning. (See how we adapt your kitchen to fit you in [Adapting a Kitchen to Human Dimensions and Movement](#)).

Increase the Usefulness of Upper Cabinets

Stand at your countertop and the object directly to your front is probably an upper cabinet. Open the door of the cabinet to get something out and you just violated one of the rules of mise-en-place. You probably had to lean or step back or to the side so the cabinet door did not slap you in the face when you opened it.

Leaving the Door Open

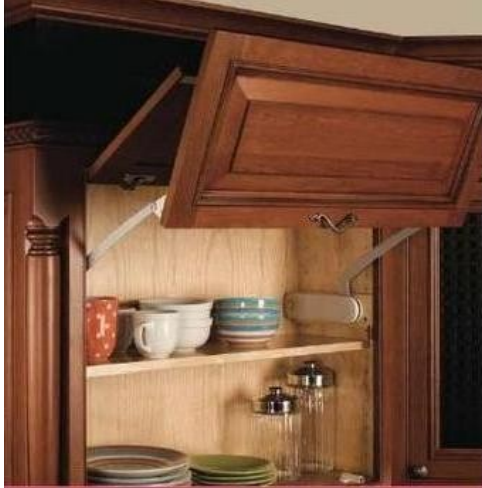
When hinges were visible, cabinet doors could open enough to lay flat. Not any more. Modern "hidden" hinges have just about eliminated the possibility of leaving the door open for easy access while you work.

"European-style" hinges usually allow the door to open only to 95°, almost perpendicular to the cabinet — perfectly positioned to crack noggins and otherwise get in the way.

You can get Euro hinges that allow the door to open to as much as 170°, permitting it to lie nearly flat against the cabinet. But these are larger, more elaborate and more expensive. Worth the cost however. But perhaps the best solution is to return to the older-style hinge.

Upper cabinets (also called "wall cabinets") are somewhat controversial. Many designers don't like them and won't use them — making lower cabinets work harder to provide adequate storage. If your kitchen is very small, it will indeed look larger without upper cabinets. The very first, very tiny kitchen I designed and built had no upper cabinets. I used shelving

Photo Courtesy [Häfele](#).



An upswing door stays nicely out of the way when it is open and then neatly hides the contents of the cabinet when closed.

and wall hooks to store things. But since wall-mounted storage is usually right at the best part of your arch of reach, not installing upper cabinet storage of some kind may severely impair your efficiency.

Upper Cabinet Doors

The problem with upper cabinets is that they have doors. Doors are a nuisance to efficient kitchen work. They keep you from just reaching into the cabinet. You first have to open the door, then get the item, then close the door again. Modern hidden "European" door hinges do not lend themselves to just leaving the door open for convenience (see the sidebar

One solution is just to abandon doors, turning the upper cabinets into what are in effect open shelves. But doors do have a purpose. They hide all of the clutter and keep dust and grease from getting into the cabinet. So it's a trade off. Some kind of door is

a necessity in most kitchens. So the question then becomes what is the most efficient upper cabinet door.

Door Operation

There are three basic kinds of door operation: swinging, sliding and tambour. The swinging door is attached to the cabinet at one edge on hinges, opening from the other side. A sliding (or bypass) door opens by simply moving to one side or rollers on glides. The tambour (think "roll-top desk") typically rolls up into the top or side of the cabinet. These are most commonly found on appliance garages. They are rare as regular cabinet doors, primarily because they are expensive and not very durable.

Swinging Doors

By far the most common cabinet door is the side-hinged swinging door. Most cabinet manufacturers offer nothing but hinged doors — no other door option is available. They are made in a nearly limitless range of styles and finishes (see [Cabinet Basics](#) to learn more about the great variety of cabinet door styles and types).

Sliding Doors

Sliding doors are appearing more frequently in newer kitchens — some are even powered, opening at the touch of a button. Their limitation, however, is that they usually must be flat, without decoration (what kitchen people call "flush" doors) a style that is not acceptable to many homeowners. Many sliding doors are tempered glass. Glass is very cleanable and if



Obscure sliding glass doors hide clutter while making it possible to see what's in the cabinet.

transparent, allows you to see what is in the cabinet. Of course, for many people, the main object of having doors in the first place is to *hide* the contents of the cabinet, so for these folks opaque or translucent glass is preferred.

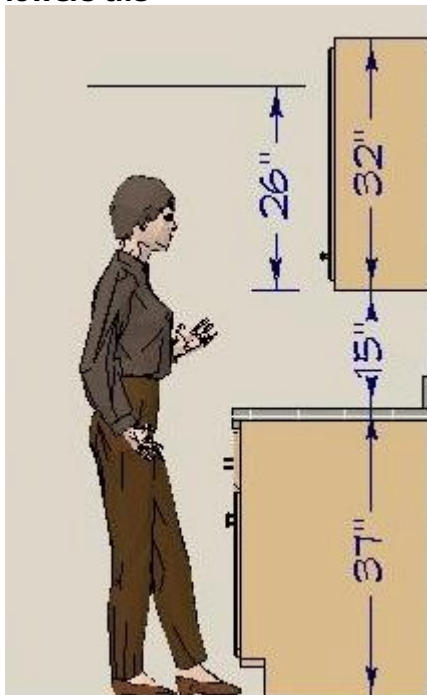
Sliding doors do have the advantage of not getting in the way when the door is left open. But, and it is a big "but" — sliding doors open only one half of the cabinet at a time. The other half is hidden behind the other door. This means a nearly constant process of opening and shutting the doors to get at the items in the cabinet.

Cabinet Height and Placement

For a 5'-10" cook...

Counter tops should be about 37" from the floor.

Upper cabinets should be 15" above the counter top — not the "standard" 18". This gives complete counter top access but lowers the



upper cabinets so more of the cabinet is reachable.

Maximum useful height of a wall cabinet is 32" of which only the first 26" is actually reachable. Any shelf above 26" needs a lazy susan to be reasonably useful.

Upswing Doors

Perhaps the best doors from an efficiency point of view are those that open upward. Upswing doors are rare in this country; much more common in Europe and Asia. Upward opening doors can be as decorative as any other door and accept all the usual door styles: flush, flat panel, raised panel and inset.

They do have limitations, however. They cannot be too low. If they are, you have to step out of the way to open them — so you might as well use less expensive side-opening doors. But on the upper 20" or so of wall cabinets, they work very well. They are slightly more expensive since the hardware to keep them up is more complex and somewhat hard to find in small quantities — although that situation is beginning to change.

Upper Cabinet Height and Placement

The ideal maximum height of upper cabinets is about 32". The top shelf should be not more than about 26" from the bottom of the cabinet. Anything higher is "stool storage" — you have to stand on a stool to get to it. There is no harm in having taller cabinets, even right to the ceiling, so long as you recognize that the top part of tall cabinets is usually unreachable and should be used to hold things only rarely used. Even the top shelf of a 32" cabinet is for most of us in the extended rather than the primary arc of reach. We can usually reach just the stuff in front of the shelf. (Lazy susans installed on the top shelf can remedy the problem, however — everything at the back of the shelf can quickly be brought within reach with a little twist of the wrist.)

The placement of upper cabinets can hamper efficiency. Most commonly they are placed 18" above the counter top. This has become the standard, not because it is the best height, but because it's where the typical 30" wall cabinet happens to fall when installed on an 8 foot wall under the usual 12" soffit and above a 36" high counter. This is, however, too high for efficient use by the most people under 6' tall.

The best reach height for most people is just 57" — about shoulder height. If the bottom of

the cabinet is at 54" then almost everything in the cabinet is *above* the best reach height. Lowering the cabinet slightly makes the stuff in the cabinet more readily accessible.

The best height for a wall cabinet is 14-116" above the counter top.

A lot of countertop appliances, however, especially coffee-makers, assume an 18" height above the counter, and use every bit of it. If you have these tall appliances, then at least some of your cabinets will need to be placed higher than the optimum height.

Lowering the upper cabinets just this 3-4 inches makes all of the bottom two shelves of the cabinet easily reachable, as well as at least the front half of the third shelf. Upper cabinet storage is now much more efficient with just this modest change.

Storage Smarts: Point-of-Use Storage

Most likely you store kitchen items in groups of like items: pots with pots, platters with platters, knives with knives. All of the knives are in one drawer, all mixing bowls in one cabinet. But that's not how you use kitchen tools. A paring knife used to prepare vegetables should be stored where vegetables are prepared; along with the peeler, corer and strainer. If baking and food preparation are located in two different areas, mixing bowls should be in the baking area, *and* in the food prep area. Store tools not in groups of like items, but by point-of-use. If you use similar bowls in two different areas, if at all possible, get two sets of bowls.

Make frequently used items visible and easy to reach. A often-used knife should be in a block on or above the counter, not hidden away in a drawer. Fetching a knife from a drawer is a multi-motion process: (1) open the drawer, (2) locate the knife, (3) remove the knife, (4) close the drawer. Typically you have to step away from the drawer to open it which adds yet more motion to the process.

Ideal primary storage requires just one motion to locate and retrieve an often-used object.

Clearly we cannot have everything we might need cluttering the counter top space, but we can have things we use most often right at hand — and everything else close by — with just a little planning.

Put the things you use most frequently in the middle of your arc of reach. This is an area between 30" and 60" high for most people and includes (1) the top two drawers of the base cabinet, (2) the counter top itself, (3) the wall behind the counter top (hang utensils there), and (4) the two lower shelves of the upper cabinet. Store the next most frequently used items in your extended arc of reach: (1) The top shelf of the upper cabinet, in the area below the second drawer of the base cabinet and (3) on the lower shelves of adjacent upper cabinets.

Photo: [This Old House](#).



Slots right in the countertop keep frequently used knives right at hand in this well-organized food prep center.

Use Drawers, not Shelves or Pull-Outs, in Base Cabinets

Fixed shelves in a base or lower cabinet are a nuisance. Anything you need seems to have migrated magically to the back of the cabinet on the lowest shelf where, without a flashlight and a lot of probing, it just cannot be found.



A bank of narrow, two-sided pantry units set on a wall near the food preparation area provides easy-to-reach single-layer food storage.

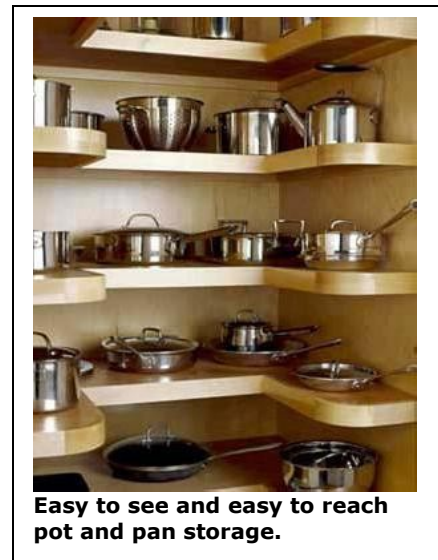
In the post WWII period, kitchen designers began combating that problem with a growing assortment of pull-outs — trays, wire and wicker baskets, stainless containers — if you can imagine it, someone is probably making it.

But a pull-out is just a drawer inside a door. It takes two motions to open the drawer because you first have to open the door (or two doors). Why not just eliminate the door altogether? Anywhere a pull-out tray is practical, a drawer is more practical. So, get rid of the doors. Use drawers in lower cabinets for efficient storage. Then go the next step and size the drawers to fit their contents.

Size Storage to the Things Being Stored

Kitchen cabinet manufacturers long ago settled on 6" as the standard top drawer depth for lower cabinets. It's not too shallow for large utensils, but not so deep that small utensils get lost. As a compromise standard it is adequate. But it does not necessarily fit your utensils. Silverware does not need a 6" deep drawer. It's too deep. But other utensils, the spaghetti fork, ladies, the meat mallet, need a slightly deeper drawer and frequently get jammed up in a 6" drawer.

I once bought a house that had cup and mug storage built into one wall — shallow shelves about 6" apart and 5"



Easy to see and easy to reach pot and pan storage.

deep behind a tall cabinet door. Every cup and mug I owned fit in it. It was so handy that I built my coffee bar right next to it. Why was it handy? There were no cups hidden in the back; because there was no "back". Every mug was out front and visible in one single layer. And that's the simple trick.

The two "Iron Rules" of storage are simply...

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- **Size storage to the things being stored, and**
 - **Store all items are in a single layer with no item hidden behind or beneath another.**
-

Storage should be sized so that whatever is stored is in one layer — all out in front. In practice that is very difficult to achieve when you only have so much room for your kitchen, but it is at least an ideal to strive for.

Shelving should follow the same pattern — all items in one, single layer. You store dry foods, for example, in four general forms; cans, bottles, boxes and bags. Cans (unless you are buying in restaurant quantities) are seldom larger than 8" in diameter or taller than 8". Can storage, then, is 8" deep and 9" high. Building a pantry 8" deep is a little impractical, but it is possible, for example, to heavy up the hinges and hang a can storage rack on the pantry door. Store bottles in higher shelves on the other door.

Boxes need 14" of depth and bags not more than 16" — so that's the depth of the ideal pantry. But who has enough spare wall for a wide, shallow pantry? So we compromise and use a pull-out pantry — essentially a wide shallow pantry turned on edge then set into a cabinet. It is excellent storage when is kept to a maximum of 18"-24" wide. At this width every item in the pantry is in view from one side or the other (as you can see in the illustration above).

Where storing some items behind others is unavoidable, use lazy susans where possible to bring items in back to the front.

Get the Dishwasher Off the Floor

Everyone who uses one knows that there is something wrong with the standard American dishwasher. It's much too hard to use. You have to bend and stoop a lot to load and unload it. You have to spend a lot of time opening and closing the top tray to reach the bottom tray. The bottom-hinged drawer gets in the way of people moving around the kitchen. It is not a very user-friendly or efficient appliance.

We don't usually think about how poorly designed our dishwasher is because most of us have never had the good fortune to use a really well designed dishwasher. There are a few out there, however. Most for commercial kitchens. Starting at \$4,000 for a basic unit, requiring 230 volt power, and just plain industrial ugly, commercial washers are not going to find their way into home kitchens soon, but their design ideas should.

Manufacturers are as keenly aware as homeowners with sore backs that the standard under-counter dishwasher location is an ergonomic disaster. They have been trying out different approaches to a solution.

One that seems to have a lot of promise is a dishwasher in a drawer. Two drawers work independently or may be run at the same time. These are rumored to have quality problems and are quite expensive. The price is not likely to come down soon.

Another solution adopted by some high-end manufacturers like the European firm Miele is to design a dishwasher to be installed in a tall cabinet of the type ordinarily used for wall ovens. This is a solution we like because it is adaptable to any dishwasher with a little fore-

Photo Courtesy [KitchenAid](#).



Dishwasher in a drawer. The top unit, at least, is easy to use. The bottom unit still requires a lot of stooping.

From [KitchenAid](#).

thought, not just expensive, high-end models designed specifically for in-cabinet installation. What we don't like is that a tall cabinet right next to the sink is not a good idea in most kitchens, so the dishwasher almost has to be more than the allowable 12" from the sink, or across the aisle. But in kitchens where it can be made to work, the elevated dishwasher is a wonderful idea.

Now that you know the basic design principals, find out about kitchen and bath cabinet choices at [Cabinet Basics](#) or learn all about countertops at [New and Traditional Countertop Choices](#), and the advantages and disadvantages of the various flooring materials for kitchens at [Flooring Options for Kitchens and Baths](#).