LAYOUT OF COMMERCIAL KITCHENS

After developing the work places, determining the specific equipment to use, and finalising the space requirements, the food facility consultant is ready to accomplish the layout phase of the planning process. Some of the equipment layouts for certain functions may already have been completed during the design of the work places. Now the designer will formalize them, first as rough sketch and ultimately in the form of blue prints.

The layout process may be described as two separate stages that occur at the same time. One stage deals with arrangements of individual pieces of equipment, work tables, and sinks with a unit which comprise a functional area or a functional department i.e. one particular area may be developed for the function of Indian and Tandoor preparations, (or) salad and sandwich preparation, as a single unit.

The second stage of layout process involves arranging the functional areas into a total facility. For e.g. the receiving, storing, prep reparation, production, pot washing areas, and non-production areas such a rest rooms, offices are brought together to form the basic floor plan for the facility.

There may be some doubt as to whether these 2 stages of layout are done at the same time. Even though the designer may be working on one stage or another at any given time, layout design must be considered in term of both stages. In essence, the layout of the total facility must be considered when laying out the component areas and vice versa.

Concepts of Layout:

There are 4 concepts of layout for a kitchen plan, they are

1. Materials or products
2. Machines and equipment
3. Workers
4. Movement.

1. Materials or products

- The products should be designed for ease of production.
- Raw materials used should require minimum no. of processing steps.

- The layout should protect the material from detrimental factors such as moisture, dust, vibration and temperature changes.
- To provide flexible layout to handle change with product
- Material storage area should facilitate taking inventory.
- Provide facilities for storing waste and scrap materials.

2. Machines and Equipment's.

- The equipment provided in the layout should be united to the required processes.
- Maximum use of the equipment should be planned.
- Layout should provide for each operations of the equipment.
- Layout should facilitate movement of mobile equipment.
- Sufficient access space for equipment maintenance should be provided.
- Proper ventilation and exhausting of equipment to be provided.

3. Workers:

- Layout should safeguard the workers by eliminating hazards.
- Adequate light should be provided.
- Proper exhaust system for fresh air should be provided.
- Layout should be free of distracting activities.
- Design of work place should correspond to the height of the workers.
- Layout should provide adequate work space.

4.Movement:

- Layout should provide for easy movement of material and workers.
- Provide for smooth flow into and out of work place
- Layout should prevent back tracking
- Delays in movement of material should be minimised.

Layout configuration: The arrangement of equipment and work places for functional areas is usually is the form of a straight line or in combination and modifications of straight line configurations. The basic patterns that may be used include;

Single straight line arrangement: This is the simplest of designs, but it is limited in the number of pieces of equipment or work places that can be arranged. The straight line arrangement may be placed along a wall or take the form of an island.

'L' Shaped arrangement: This is a modification of the straight line arrangement to accommodate more equipments and work places, it is sometimes used where linear space is limited. The 'L' shaped configuration is suitable for seperating two major groups of equipment. One group of equipment would be placed on one leg of the 'L', the other group forming the second leg.

'U' shaped arrangement: 'U' shaped configuration is ideal for small areas where only one or two employees are working. One disadvantage of this configuration is that straight line flow through the area is not possible.

Paralell, back to back arrangement: This configuration is an arrangement of two parallel lines where the backs of the equipment and/or work places on each line are adjacent to each other. This arrangement centralizes the utility lines required for the equipment. Some time a short wall i constructed between the two rows of equipment, in which case provision for cleaning and maintenance should be provided.

Parallel face to face arrangement: This arrangement utilises two straight lines of equipment and work places where the front face each other and are separated by an aisle space. This is very common configuration that can be used in many areas of facility. This configuration requires two separate utility lines for equipment as compared to the single utility line used in the parallel back to back arrangement.

The final arrangement for most facilities is usually composed of a combination of configuration of equipment and work places. Only the smallest of operations would use a single configuration of the layout facilities.

After arriving at the total area requirement for the main kitchen, the following is the estimated percentage of production/space for functional areas:-

FUNCTIONING AREAS	**SPACE ALLOTTTED %**
Receiving	5
Food storage	20
Pre - preparation	20
cooking	12
Baking	10
Potwash - KDS	5
Traffic apsles	16
Garbage – wet/dry	5
Employee facilities	5
Miscellaneous	2

PLANNING OF VARIOUS SUPPORTING SERVICES

Pot and Pan Washing: The pot and pan washing function is also preferably done in a separate area instead of combining it with other areas as some small operations may be inclined to do. The basic pot and pan washing function can be handled with a 3 compartment sink and drain boards, sufficient space for storing the soil utensils have to be provided.

In some operations, a large storage area for soiled utensils may be required because they are not washed as soon as they are received. This occurs when the same personnel who wash dish, also wash the pots and pans. Pot washing machine are considered for large food facility if they can be economically justified.

A pot wash area is suppresed by 6" than the regular floor level of the kitchen, to avoid the water flowing into the main kitchen area. Heavy jet washers with water at a temperature of 88 degrees is used to wash pots because they easily remove the dirt and fat and make cleaning easy. Since the pot wash area becomes very messy with waste food and fat, anti-skid tiles are recommended

for the floor and white glazed tiles on the three side walls upto 8' feet height. A minimum area of 10' x 10' is required.

Wet Grinding Area: In India wet grinding area is considered to be one of the supporting services to the main kitchen. There will be a minimum of two wet grinders in any small hotels, so that there is a stand by in case of breakdown. Wet grinders are tailor made and are of different capacities. The ideal functional area required for a wet grinding is 10' x 4'. The area has to have anti-skid tiles for the floor and glaze tiles on the wall to maintain hygienic conditions.

Chef's Cabin: The chef's cabin has to be ideally located, so that, he has a clear view of the entire kitchen. In some organizations and some hotels the Chef cabin is being utilized to store the imported stock of ingredients like, spices, wine etc. Ideally 10' x 10' is required for the chefs cabins.

Chef's Larder: This is a sub - store which is located within the kitchen, in the control of the chef. The quantities of material drawn for the day from the main food store is stored in the chefs larder, since there is no space to store this in the individual kitchen, the drawn material is stored in a place with the kitchen, which is called as chefs larder. Chefs larder is convenient for the cooks, because they can draw material at any given time of the day even after the main food store is closed for the day in the evening. Large quantities of food material should not be stored in a chef larder because it blocks the capital of the hotel.

EQUIPMENT REQUIREMENT FOR COMMERCIAL KITCHEN AND SPECIFICATION

There are various heavy and light equipment required for the commercial kitchens. Determining the specific equipment required for the proposed kitchen is one aspect of design on which considerable time can be spent.

Factors to be considered

Type of equipment

Capacity

Type of Menu

Number of Portion

- No. of customers,
- Menu preference, and their arrival pattern.

Size

Space available

Efficiency

Future Changes Anticipated

The method of preparations and production for each item is then evaluated.

- Items individually prepared to order.
- Items prepared in small batches in anticipation of orders,
- Item prepared in large batches,
- Item that are partially batch prepared and finished when orders are received.
- Maintenance
- After sale service

Equipment Check list

The equipment required for the kitchen varies from one type of operation to another depending on the menu offerings, the nature of food materials, and method of preparation, service, and personal desire of the owners, manager, or chefs. The following list of equipment is grouped by typical functional areas.

Refrigerated, storage	**Vegetable and Salad**	**Cooking – All kitchens**
Cold Rooms:	**Preparation**	Bain Marie counter with
	French-fry cutter	overhead heaters.
Shelves	Peeler	Chinese range
Dairy	SS preparation table	Condiment cabinet
S.S.Trolleys	Salad rack	S.S.work table
Vegetables	Vegetable cutter	

Freeze Room: Fish Meat **Cold Kitchen** Meat Saw Gravity feed slicer Meat Block Reach in Refrigerator Reach in Freezer Scales Work Table with service and drain board SS Utility Trolley Mincer – Chopper Sausage Stuffer Buffalo Chopper	Slicer/Chopper **Pantry** Griddle Microwave oven SS worktable – sink drain board Toaster Salamander Reach in Refrigerator Bread Cabinet Juice extractor Coffee/Tea Pantry man Ice Cream cabinet	S.S. work table with sink unit S.S.work table with OH shelf Deck oven Food warmer Brat pan Griddle Grill Gas cooking ranges (a la carte, Indian kitchen, Banquet,) Refrigerated Table Reach in Freezer Reach in Refrigerator Salamander Steam jacket kettle Pot rack SS utility trolley Vertical cutter/Mixer Dosa Plate Chapatti Puffer Wet Grinder

Bakery and Confectionery	**Snacks bar**	**Pot work**
S.S.Work Table	S.S.Counter	Pot rack
Bread Moulder	Coffee maker	Shelves
Bread Slicer	Food warmer	Sink
Cooling rack	Freezer	Pre rinse faucet
Convection oven	Fudge warmer	Water agitator
Deck own	Griddle	Drying rack
Dough divider	Grill	**Wet Grinding**
Dough rounder	Gas range	Convention wet grinder
Dough sheeter	Work table	Tilting model wet grinder
Dough kneader	Working table with sink and drain board	Worktable.
Weighing scale	Slush Machine	
Planetary Mixer	Juice dispenser	
Proofing cabinet	Pastry cabinet	
Proofing rack	S/W grill	
Ice cream machine	Soda fountain	
	SS utility trolley	
	Bain Marie counter	
	Chaat Counter	
	Dosa Plate	

EQUIPMENT SPECIFICATION

STAINLESS STEEL WORK TABLEWITH THE UNDERSHELF.

- OS - 2100 x 750 x 850 mm
- MS framework
- Table top 16 gauge S.S.304
- Under shelf with 20 gauge S.S.304, 6 inch. above ground level.
- Tubler stainless steel bullet legs.
- Edges to be marine edge. No.4 finish.

STAINLESS STEEL WORK TABLE WITH SINK:

- OS - 2100 x 750 x 850 mm
- MS framework
- Table top 16 gauge S.S.304
- Under shelf with 20 gauge S.S.304, 6 inch. above ground
- Level only on non-sink side.
- Tubler stainless steel bullet legs
- Edges to be crimped edge.
- The unit shall be provided with one sink on LHS size
- 450 x 450 x 450 mm.
- Splash back shall be provided 150 mm height.No.4 finish.

DOSA PLATE:

- The unit shall be of open frame construction with 12" Stainless steel panels on all sides with loovers.
- The framework of the dosa plate is 12 SWG S.S. Rods.
- One under shelf shall be provided - 20 swg. 200 mm from GL.
- Uprights shall be provided with bullet feet.
- The griddle plate (GI) of 16 mm thickness, machine polished
- Splash back shall be welded to the frame, 6 inch. height.
- S.S.trough to be provided with the removable grease-collecting tray.
- "V" burners 2 Nos. to be provided with individual pilots, United (Mumbai) make.
- Gas inlets on both sides of the unit.
- O.S. - 1500 x 750 x 850 + 150 mm.No.4 finish.

TWO BURNER S.S.GAS RANGE (BULK COOKING)

- The unit shall be open frame structure provided with cross bracings.
- Top S.S.sheet shall be 16 SWG.
- S.S.panelsupto 12" from the top shall be 18 SWG.
- The vessel rests shall be of cast iron size 450 x 450 mm.
- S.S. spillage or drip tray to be provided.

- 2 Nos. high-pressure burners - T.22 United (Mumbai) make along with pilots.
- Provision of gas inlets shall be on both sides.
- Exhaust loovers on all 3 sides of the panel.
- Needle control valve to be provided.
- Marine edges to be provided.
- O.S. 1500 x 700 x 600 mm.No.4 finish.

IDLI STEAMER:

- All stainless steel 18 gauge unit shall be steam injected on all sides.
- The capacity of the unit 108 idlies per batch.
- The unit shall have 2-chamber model with each unit having chamber to prepare 54 idlies per batch.
- Stainless steel idly trays shall be provided to make 9 idlies each tray.
- Door shall be insulated and provided with rubber gaskets.
- Hinged mechanism for doors closing.
- Water outlet for the unit to be provided.

STEAM JACKETTED VESSEL:

- All stainless steel 16 SWG steam-cooking unit shall be double jacketed.
- The width of the mouth shall be 18" dia. with lid.
- The vessel shall be mounted on 16 SWG stainless steel pipes provided with base plates of 4" x 4" 10 SWG SS to facilitate grouting.
- The unit shall be provided with tilting handles and necessary standard bearings for smooth operation.
- The vessel shall be provided with drain valve and pressure release valve.
- The capacity of the vessel 75 lits.
- Heliarc welding to be used in all places.
- Overall size 750 x 750 x 900 mm.

CHAPPATHI PLATE WITH PUFFER:

- The unit shall be open frame structure with under shelf (20 SWG)

- Under shelf 6” above ground level.
- Stainless panel of 12” width shall be provided on all sides with loovers.
- A splash back 150 mm shall be provided.
- The chapatti plate shall be a one-piece machine polished 5/8” thick plate.
- The puffer shall be a cast iron with vents.
- V” burner to be used. 2 for chapatti plate and 1 for puffer
- Individual pilots and control valves to be provided.
- Spillage/drip tray to be provided in S.S.
- Adjustable nylon bullet feet.
- O.S. 1300 x 750 x 850 + 150 mm
- Chapatti plate - 950 x 700 mm
- Puffer plate - 300 x 700 mm.

ALL STAINLESS STEEL 6in1 BAIN MARIE SERVICE COUNTER:

- The top of the bainmarie shall be 16 SWG S.S.
- 3 side blinders shall be of 20 SWG
- The under shelf 18 SWG shall be 6” above GL
- The unit shall be provided with 1/2 G.N.pans (gastro norm pans) 200 mm deep and with 2 Nos. round containers of 225 mm x 200 mm depth made of 16 SWG with lids.
- The unit shall be provided with rotator switch on/off, thermostat and pilot lamp indicator of standard make.
- One partition inside the counter on the non-bainmarie container side at 12” height from the bottom.
- O.S. 1500 x 700 x 850 mm.

A complete discussion of selecting and sizing of all the different types of kitchen equipments is beyond the scope of this study material. A brief discussion of frequently specified major items of equipment would serve to illustrate this part of the planning process.

A: DEEP FAT FRYERS:

Deep fat fryers are available in a variety of types, capacities and degree of automatic operation desired. The productive capacity of a fryer is related to the litres of fat in the fryers, the heat input, and the cooking time required for various foods. Typical designs of fryers are based on a fat-to-food ratio 6:1. This indicates that each kg. of food to be fried requires 6 lits. of oil (or) fat in the deep fat fryer. Conventional fryers are tailor made to the requirement of the client to various capacity, 1/2 lit, 1 lit. 3, 5, 7 and so on.

Pressure fryers make another category of deep fryers they are sealed to permit steam pressure to build up between the lid and the fat surface. The steam is generated from the foods fried or by water injectors. The pressure fryer reduces the loss of moisture from foods. Heat transfer in a pressure fryer is greater than a conventional fryer and consequently the cooking time is shorter. The food is brown outside, moist and juicy on the inside.

B. BRATT PAN (Tilting frying pan): The brat pan is one of the most versatile pieces of cooking equipment. Its design is such that it can be used to boil, simmer, grill, sauté, fry and curries. For some items like Indian gravies, sambar, foogath can be done in the tilting frying pan with some savings in time that would normally be spent transferring foods and cleaning other utensils. Brat pan may be free standing; walls mounted, counter mounted and are available in gas and electricity model. There are models which are ignited by electricity and working on gas. The brat pan is tilted by a worm and gear assembly operated by hand wheel. They are tailor made to difference capacities of 50 lits to 300 litrs.

C. GRIDDLE: Griddle are flat top piece of equipment heated from beneath, as compared to grills which have heating sources both above and beneath. Griddles are used for high production food service and fast food operations. Grills are more of a specialty piece of equipment. Both gas fired and electric models are suitable for most purposes. Griddle are available in variety of sizes from small i.e. 10" x 20" to as large as 72" x 24". Griddles are free standing, counter-mounted, mobile or built in as the situation demands. The height of the splashguard, location and the width of the grease trough should be

considered when specifying griddles. Combination griddle-grill is also available. This provides greater flexibility for the preparation of different menu items.

D. FOOD CUTTERS: Food cutters are versatile piece of equipment that can handle meats, vegetable and fruits. The food cutters can cut, dice, shred, and almost liquefy foods, depending upon the amount of time the food is left in the cutter. The foods to be size reduced are placed in a bowl, which rotates and exposes them to high speed rotating blades. Both bench and floor models are available. Some cutter models are equipped with an attachment hub for accepting various attachments.

E. STEAM JACKETED KETTLES: Steam jacketed kettles are constructed of two stainless steel bowls sealed one within the other, with almost 2" of space between them for the introduction of steam. The amount of steam surface between the bowls is referred to as jacketing, and models from half-jacketed to full jacketed are available. The operation of steam-jacketed kettles utilizes steam, which is condensed back to water in the jacket to provide the heat for the inner kettle. A condensate line is provided to remove the water that accumulates. The amount of heat input is dependent upon the pressure and amount of steam allowed to enter the jacketed area. There is a pressure gauge to indicate the pressure. In case of excess pressure is let into the jacket, there is a pressure /air release valve to reduce the pressure. These kettles are used to cook rice, dhal, boil milk, and cook vegetables. They are available in 50, 100, 200 and 300 lit. Capacity.

F. GAS COOKING RANGE: Gas cooking ranges have open top burners with high-pressure burners, T-22, T-35. They are tailor made for the client's is requirement. They are manufactured in different combinations such as 2 in 1, 3 in 1, 4 in 1 and 6 in 1. The length and breath of the range depends on the quantity food to be prepared. In case of a la carte preparation, a combination of high and low pressure burners is used, the area being 14"x 14". The height of the cooking ranges 33" - 34". But for ideal bulk cooking

the length various between 20” to 24” per range, and. the height is reduced to 18” to 20”. Heavy gauge stainless steel and heavy-duty supports are used for these cooking ranges since it involves bulk preparation.

A Chinese gas cooking range is aptly designed for authentic Chinese delicacies, with a cast iron dome, to prevent the direct heat on to the chef while cooking with a wok. A 12” to 14” height splash back with a swivelling faucet with controls in front panel for immediate water, and a drain channel at the rear to enable to chef to empty the wastewater is also provided in this equipment. They are ideal with flat open top gas range in the middle for stockpot and dome cover gas ranges on either side for a la carte preparations.

G. DOSA PLATE: The dosa plate are similar to the griddle which have hot plates specially designed to prepare dosas. The plate is thick machine polished, mild steel with even heat distribution for optimum use. The M.S. plate rests on stainless steel frame, and it has S.S.top, front and a specially placed oil spillage trough. The splash back on all three sides of the dosa plate to avoid splash of oil or batter. For uniform heat distribution a “V” shaped burner is placed. This unit is available in electric/gas. It is custom-built size to prepare a minimum 2-3 dosas to 8-10 dosas at a time.

H. IDLI STEAMER: Idly steamers are S.S.cabinets with tight fitting doors with gaskets. Steam is injected into the cabinet to pre heat to the required temperature. Idly plates are made of S.S./Alum. with different combinations. The steam is injected from the sides, top and bottom. These cabinets are tailor made to accommodate 2-4-6 idly plates at a time. It is advisable to have 2 plate compartments because steam is lost during the process of loading the idly plates.

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