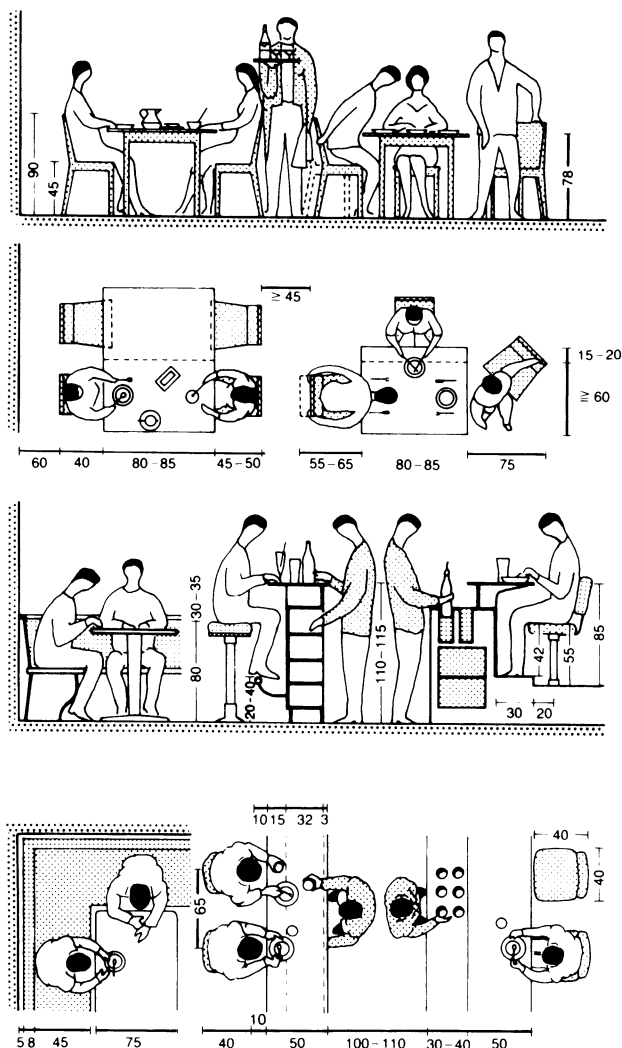


RESTAURANTS: SPACE REQUIREMENTS

(See also pp. 255–6)

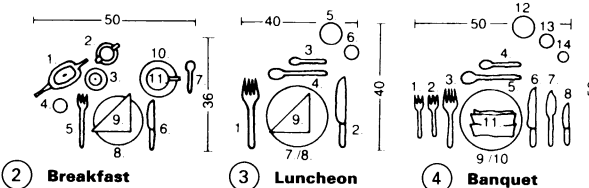
To be able to eat comfortably, one person requires a table area of around 60cm wide by 40cm deep. This provides sufficient clearance between adjacent diners. Although an additional 20cm of space in the centre for dishes and tureens is sometimes desirable, an overall width of 80–85cm is suitable for a dining table. Round tables, or tables with six or eight sides, with a diameter of 90–120cm are ideal for four people and can also take one or two more diners.

The minimum spaces for thoroughfares, or between a table and a wall are shown in ①. Note that round tables require somewhat more floor area.



① Space requirements for server and diner

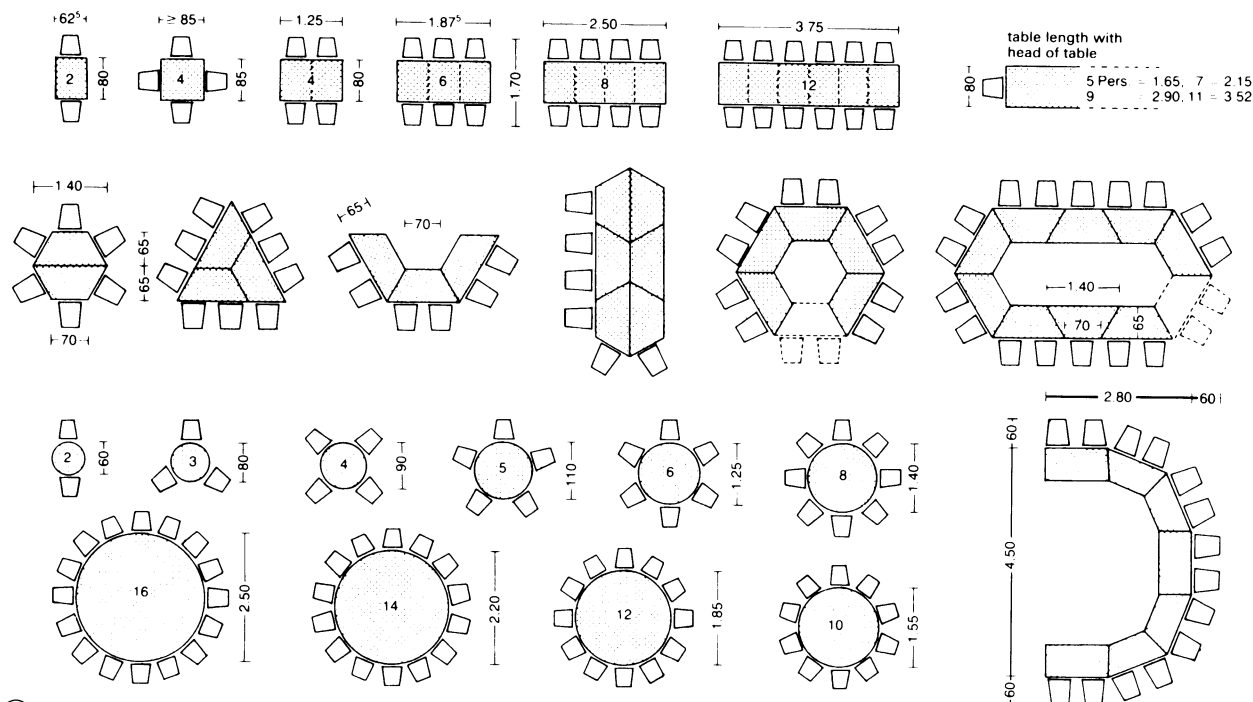
- ② **Breakfast setting** 1: tea or coffee pot; 2: milk jug; 3: jam or butter dish; 4: sugar basin; 5: fork; 6: knife; 7: teaspoon; 8: plate; 9: serviette; 10: saucer; 11: tea or coffee cup
- ③ **Simple lunch setting** 1: dinner fork; 2: dinner knife; 3: soup spoon; 4: dessert spoon; 5: tumbler; 6: wine glass; 7: soup dish; 8: dinner plate; 9: serviette
- ④ **Banquet setting** 1: entrée fork; 2: fish fork; 3: dinner fork; 4: soup spoon; 5: dessert spoon; 6: dinner knife; 7: fish knife; 8: entrée knife; 9: soup dish; 10: dinner plate; 11: serviette; 12: tumbler; 13: wine glass; 14: liqueurglass



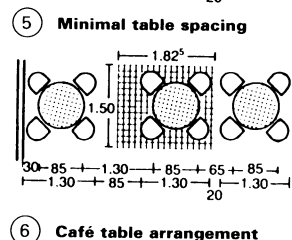
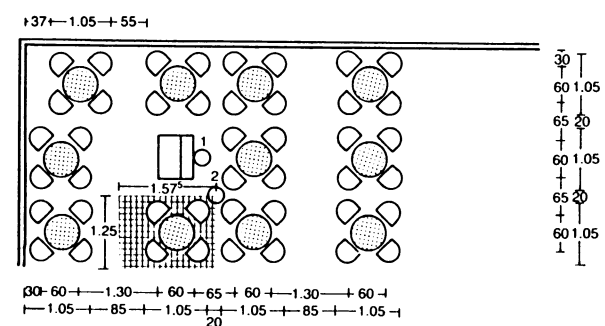
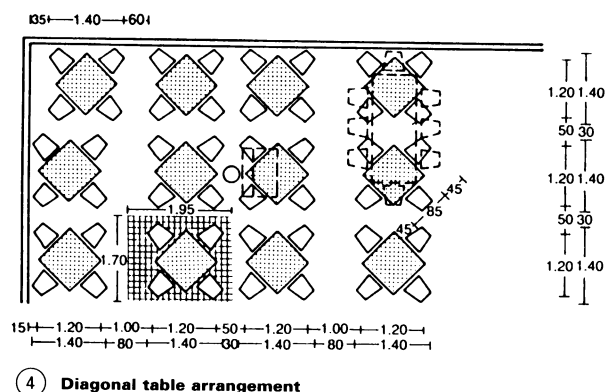
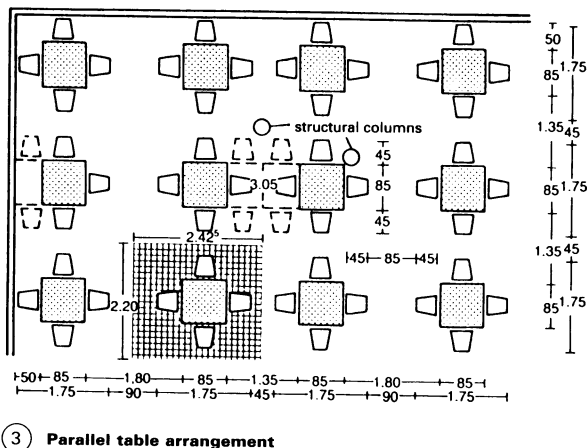
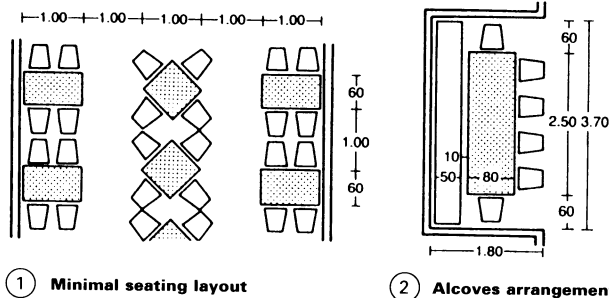
② Breakfast

③ Luncheon

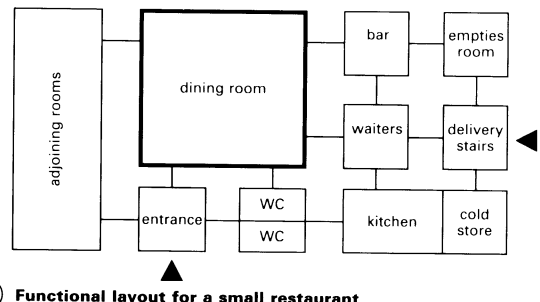
④ Banquet



⑤ Tables/seating plans



RESTAURANTS: ARRANGEMENTS



Before any restaurant or inn is built, the organisational sequence should be carefully planned. It is essential to establish what meals will be offered, and at what quality and quantity. It is necessary to decide whether it will be à-la-carte with fixed or changing daily menus, plate or table service, self-service or a mixed system. Before deciding on the layout, it is important to know the anticipated numbers and type of clientele and the customer mix. Bring in planning specialists in kitchen and cold store design, as well as in electrical, heating and ventilation systems and washing/toilet facilities.

The position of the site will suggest what type of inn or restaurant is likely to be suitable.

The main room of a restaurant is the customers' dining room, and the facilities should correspond with the type of operation. A number of additional tables and chairs should be available for flexible table groupings. If appropriate, provide special tables for regular customers.

Any function or conference rooms should have movable furniture to allow flexibility of use. A food bar may be installed for customers who are in a hurry. Large dining rooms can be divided into zones. The kitchen, storerooms, delivery points, toilets and other service areas should be grouped around the dining room, although toilets can be on another floor → 7.

Structural columns in a dining room are best in the middle of a group of tables or at the corner of a table → 3. The ceiling height of a dining room should relate to the floor area: $\leq 50 \text{ m}^2$, 2.50m; $> 50 \text{ m}^2$, 2.75m; $> 100 \text{ m}^2$, $\geq 3.00 \text{ m}$; above or below galleries, $\geq 2.50 \text{ m}$.

Guidelines for toilet requirements in inns or restaurants are shown in → 9.

dining floor area	walkway width
up to 100 m^2	$\geq 1.10 \text{ m}$
up to 250 m^2	$\geq 1.30 \text{ m}$
up to 500 m^2	$\geq 1.65 \text{ m}$
up to 1000 m^2	$\geq 1.80 \text{ m}$
over 1000 m^2	$\geq 2.10 \text{ m}$

customer places	toilets men	toilets women	urinal bowls	urinals (m)
50	1	1	2	2
50-200	2	2	3	3
200-400	3	4	6	4
400	- determine in individual case -			

8 Walkway widths

The minimum width of escape routes is 1.0m per 150 people. General walkways should be at least 1.10m → 8, with clearance heights $\geq 2.10 \text{ m}$. The window area should be $\geq 1/10$ of the room area of the restaurant.

type	chair occupancy per meal	kitchen area required (m^2/cover)	dining area required (m^2/seat)
exclusive restaurant	1	0.7	1.8-2.0
restaurant with high seat turnover	2-3	0.5-0.6	1.4-1.6
normal restaurant	1.5	0.4-0.5	1.6-1.8
inn/guesthouse	1	0.3-0.4	1.6-1.8
approx. 80% supplement is added for storage rooms, personnel rooms etc. cover = seat \times no. of seat changeovers			

9 Toilet facilities

tables	seats	waiter service (m^2/seat)	self-service (m^2/seat)
square	4	1.25	1.25
rectangular	4	1.10	1.20
rectangular	6	1.05	1.10
rectangular	8	1.05	1.05

11 Total space requirements for dining rooms: 1.4-1.6 m^2/place

main aisles	min 2.00m wide
intermediate aisles	min 0.90m wide
side aisles	min 1.20m wide

10 Floor area requirements

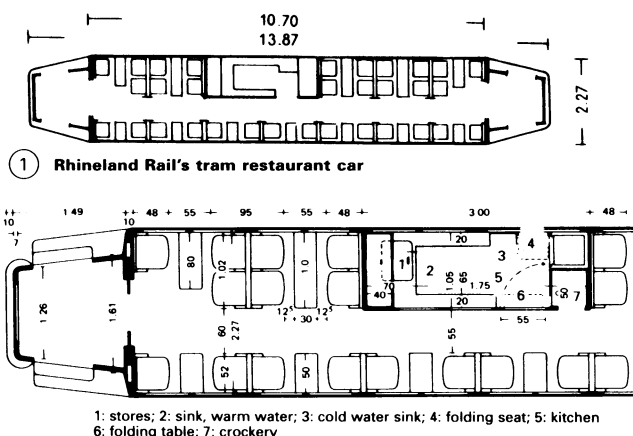
12 Aisle widths

RESTAURANT CARS

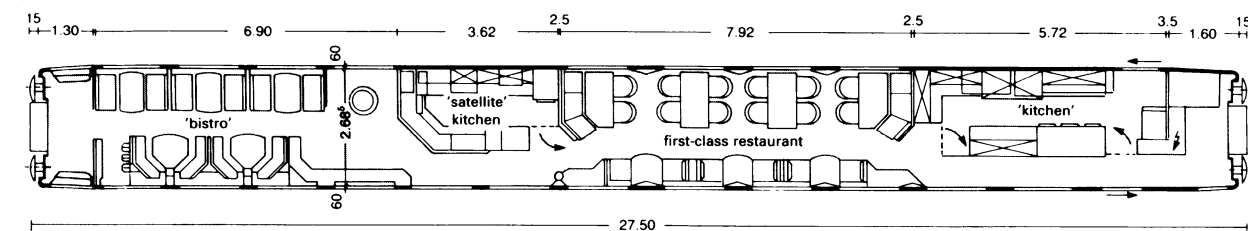
The space needed for dining services in long-distance trams → ① + ② is small compared with train dining cars, and this is the result of many years' experience and numerous design changes.

The kitchen arrangements use most of the available space because of the need for wide doors and service hatches, and exceptionally large refrigeration units → ⑧.

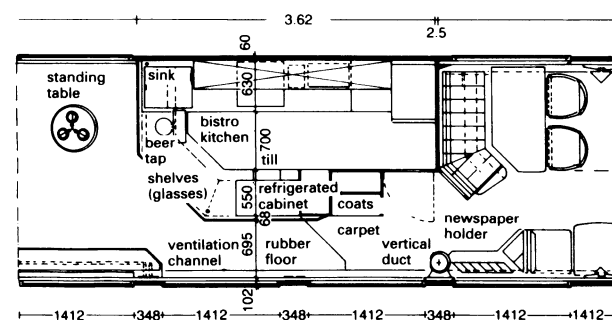
All dishes have to be washed up in the kitchen between two meal services (main and snack lunch). Service in the dining car is made easier because the number of customers is limited to the number of places → ③ + ④.



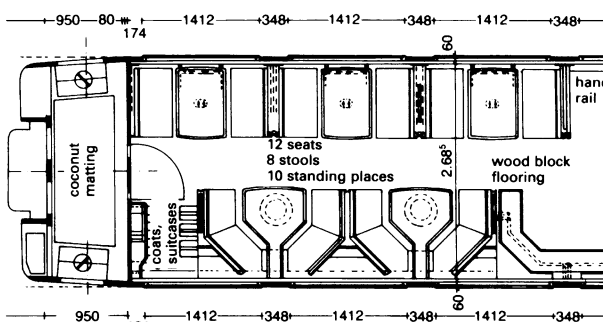
② Details of ①



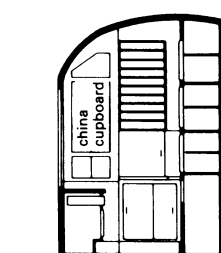
③ Floor plan of the Deutsche Bundesbahn 'Quick-Pick' restaurant car



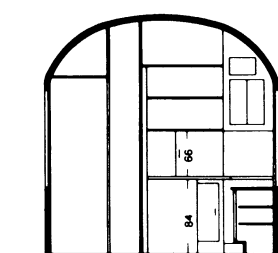
④ Floor plan of 'satellite kitchen' → ③



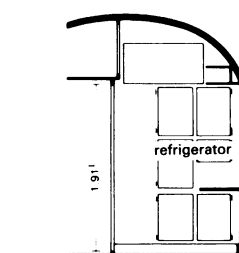
⑤ Floor plan of 'bistro' → ③



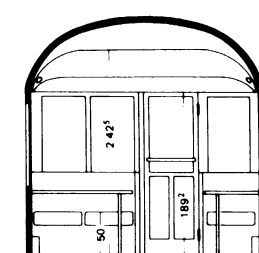
⑥ Cross-section of preparation area



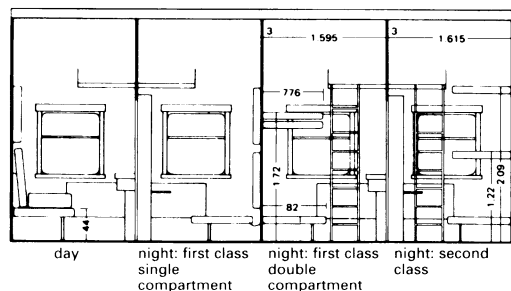
⑦ Cross-section of kitchen



⑧ Cross-section of refrigerator area

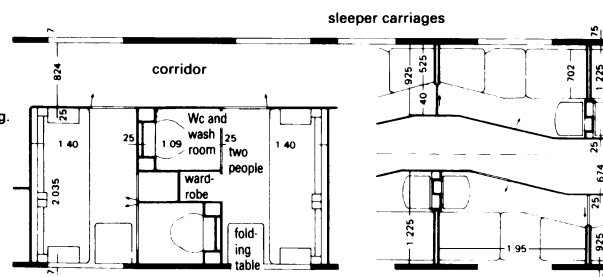


⑨ Cross-section of restaurant car

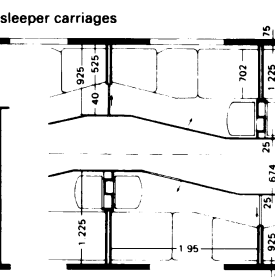


⑩ Longitudinal section

dimensions only possible with constant ventilation (e.g. as for dormitories with bunks and the like)

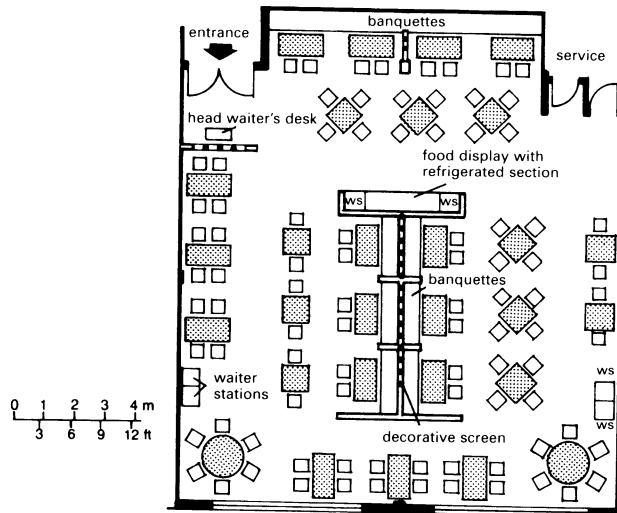


⑪ Double compartment

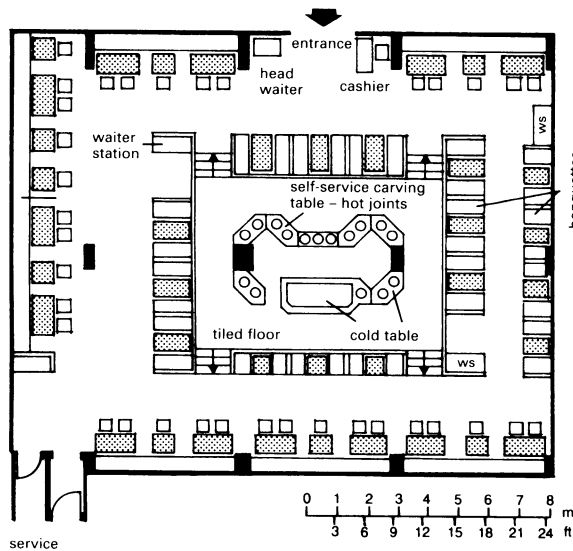


⑫ Compartment with berths along the train axis

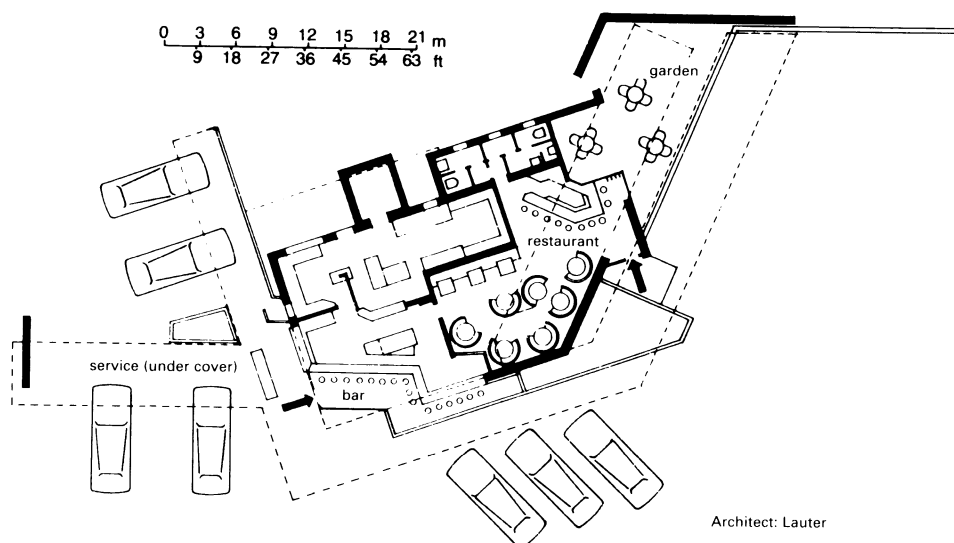
RESTAURANT TYPES



① Traditional restaurant: 110 seats



② Restaurant seating 124, with self-service carving table



③ Drive-in restaurant, California

Architect: Lauter

Traditional restaurants → ① should ideally have space for a display table and flambé work. The tables should be arranged with generous spacing and seating.

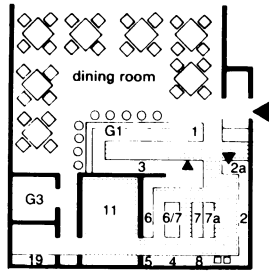
In speciality restaurants the space requirements vary widely. Display cooking, a grill, a dance floor and special decorative effects may be required. A separate bar might also need to be included within the restaurant.

Ethnic restaurants are generally considered to specialise in non-European food, particularly Asian and Oriental. Depending on the market, traditional foods and methods of preparation may be modified to suit Western tastes. Character is often expressed in the design of the premises and rituals of food presentation and service.

Drive-in restaurants → ③ supply food and drinks direct to customers in their cars, allowing visitors to eat without leaving their vehicles if they so choose. One waiter can serve six cars. For access and service provide canopies and covered ways. There should also be a separate dining hall, with parking space close to the drive-in service.

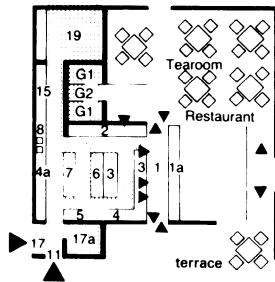
Every public house has a different pattern of trade depending on location, catering facilities and time of year. Drinking is often concentrated at certain times, which are usually after 20.00 and particularly on Fridays and at weekends. Depending on its origin, a pub may emphasise its historical rustic character or the Victorian-Edwardian sophistication of later town houses. Pub designs often follow themes to recreate foreign characteristics (e.g. Irish pubs and Belgian or American bars).

RESTAURANTS AND RESTAURANT KITCHENS



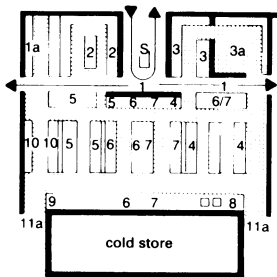
1 Snack-bar

- 1 meals and drinks servery
- 2 dishwasher
- 2a crockery returns
- 3 drinks bar with mixer, toaster, food containers etc.
- 4 oven for small pastry items
- 5 food storage
- 6 rotisserie
- 6/7 cooker rings
- 7a water boiler and steam machine
- 8 pot and pan washer
- 11 stores/office; catering size refrigerators and freezers instead of cold store
- 19 staff toilets
- G1 bar counter
- G3 customer toilets



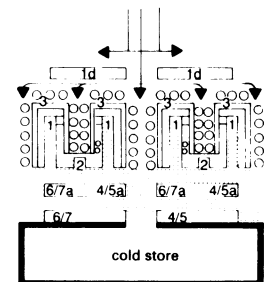
2 Café restaurant

- 1 waiters' walkway
- 1a service counter and cash tills
- 2 dishwasher
- 3 drinks bar with mixer, toaster, ice cream freezer etc.
- 4 pastry preparation
- 4a pastry oven
- 5 sandwich preparation
- 6 reheating equipment (e.g. soup)
- 7 cooker rings
- 8 pot and pan washer
- 11 empties
- 15 linen store
- 17 deliveries and (a) store
- 19 staff toilets and cloakroom
- G1 toilets
- G2 telephone cubicle



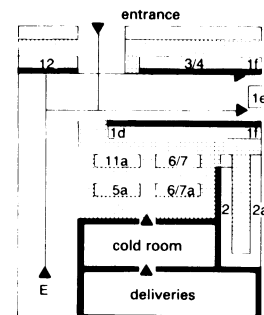
3 Restaurant kitchen in large hotel

- 1 waiters' walkway
- 1a garden service counter
- 2 dish-washing area
- 3 drinks counter
- 3a drinks cellar
- 4 pastry counter
- 5 cold dishes
- 6 hot dishes and sauces
- 6/7 table with hot store
- 8 pot and pan washer
- 9 vegetable preparation
- 10 meat preparation
- 11a deliveries, and access to stores, offices, staff cloakrooms and toilets
- S service accessories and tills



4 Restaurant with buffet and vending machines

- 1 serving aisles in U-shaped counters
- 1d vending machines
- 2 link between two counters with covered dishwashers, operated from both sides, each with two rinsing basins
- 4/5 cold meal preparation
- 4/5a cold servery (salads, ices, desserts)
- 6/7 griddle, soup heater, water boiler etc.
- 6/7a hot servery (bain-marie, hotplates)



5 Self-service restaurant

- 1d self-service buffet with grill and chip fryer
- 1e sauces, condiments, cutlery
- 1f cash till
- 2 dishwasher
- 2a crockery returns
- 3/4 food and drinks servery (service to street possible)
- 5a cold meal preparation table
- 6/7 heating units, used from both sides
- 6/7a hot meal preparation table
- 11a refrigerators, used from both sides
- 12 sales kiosk (serving inside and to street)
- E entrance

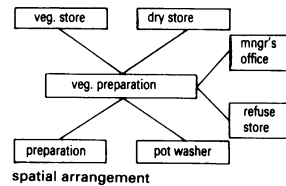
Snack-bar layouts → ① can be suitable for up to 60 seats in eating houses with fast turn-around times (five or six seating changes at lunchtime; two in the evenings). In between meal times, coffee, cakes and sandwiches can be served. The kitchen mainly makes use of ready-made items, and daily deliveries mean that stores do not need to be particularly large.

A café restaurant → ② with a tea room is usually a town-centre business located in a busy area. A café does not serve alcoholic drinks except for premium bottled beers, liqueurs etc., and specialises in hot and cold patisserie and snacks. Tea rooms serve alcohol-free drinks, patisserie and sandwiches, and have capacity for about 150 seats. They normally open from 11.00 to 17.30 p.m. They serve mainly pre-made meals, and therefore need little storage space.

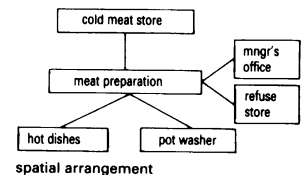
A restaurant kitchen in a large hotel → ③ caters for one or more large restaurants with adjoining rooms, and sometimes supplies external locations or businesses. May have to feed 800–1000 people. The waiters' walkway may be in the centre, with special serving counters in the garden, or possibly of the bowling alley type with direct access to adjoining rooms. The kitchen is arranged in a cellular system, with large appliance blocks.

A restaurant with a buffet and vending machines → ④ provides a fast luncheon service for working people in restaurants, canteens, department stores and motorway service stations. Their capacity is about 500 people per hour. The kitchen only completes ready-prepared meals, except for salads and ice cream.

Self-service restaurants → ⑤ are suitable for department stores or in office blocks. Nothing is made on the premises. All supplies are ready-made and deep frozen.



spatial arrangement

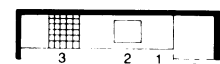


spatial arrangement



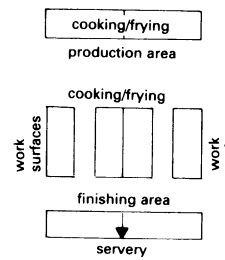
- 1 dishwasher
- 2 peeling catcher
- 3 cleaning table
- 4 storage surface
- 5 rinser
- 6 work surface/cupboard below
- 7 cutting board (800 x 400 mm)
- 8 universal machine
- 9 hand basin

6 Vegetable preparation

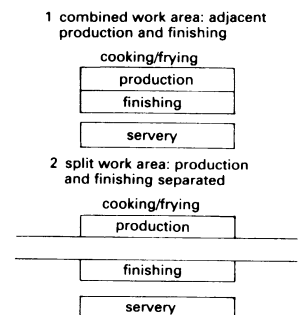


- 1 work table
- 2 general cutter
- 3 freezer cabinet
- 4 cutting board (800 x 400 mm)
- 5 table scales
- 6 stirring/beat-ing machine
- 7 hand basin
- 8 storage surface

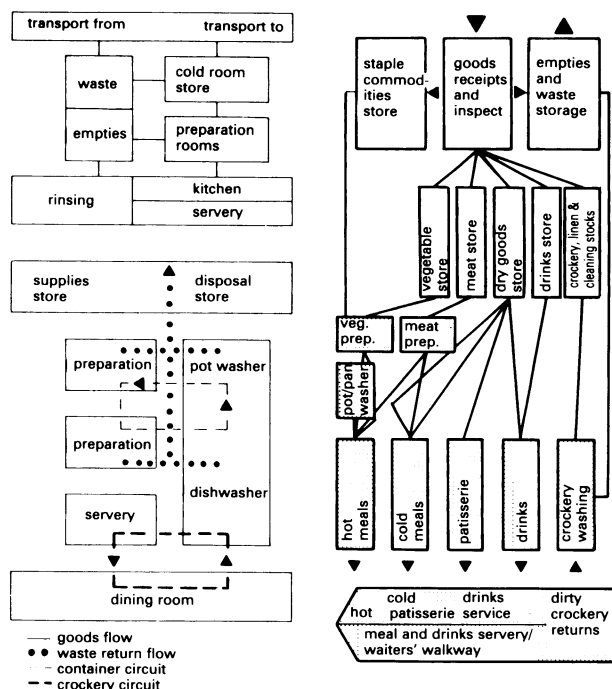
7 Meat preparation



8 French system for hotel kitchens; cooking area at right angles to the servery; split production/finishing



9 American system for hotel kitchens; cooking area in parallel with the servery



① Restaurant kitchen - function

② Restaurant kitchen - organisation

Bistros, snack-bars, small cafés, or speciality restaurants with 40–60 seats are classified as small operations. Small to medium units with 70–100 seats, on the other hand, require carefully zoned and fully fitted kitchen systems. Large restaurants (motorway service stations, fast restaurants, large hotel operations) often achieve considerably higher place numbers, frequently with integrated meal bar or self-service areas.

restaurant size/ seats	small (up to 100)	medium (up to 250)	large (> 250)
goods receipts	0.06–0.08	0.05–0.07	0.04–0.06
empties	0.05–0.07	0.05–0.07	0.04–0.06
waste/refuse	0.04–0.06	0.04–0.06	0.03–0.05
office – stores manager	–	–	0.02–0.03
supplies/waste disposal	0.15–0.21	0.14–0.20	0.13–0.20
pre-cooling room	cupboards/ storage	0.03–0.04	0.02–0.04
cold meat store	surfaces	0.05–0.06	0.03–0.05
dairy products store	–	0.03–0.04	0.02–0.03
cold vegetable/fruit store	–	–	0.03–0.05
deep-freeze room	cupboards/ storage	0.04–0.05	0.03–0.04
other cold stores (patisserie/cold meals)	surfaces	0.03–0.04	0.02–0.03
chilled goods storage	0.04–0.31	0.21–0.26	0.16–0.21
dry goods/food store	0.13–0.15	0.12–0.14	0.10–0.12
vegetable store	0.08–0.10	0.06–0.08	0.04–0.06
daily supplies	0.04–0.06	0.03–0.04	0.02–0.03
ambient storage	0.25–0.31	0.21–0.26	0.16–0.21
vegetable preparation	0.08–0.10	0.05–0.08	0.04–0.06
meat preparation	0.06–0.09	0.04–0.07	0.03–0.05
hot meals	0.26–0.33	0.19–0.24	0.15–0.21
cold meals	0.13–0.15	0.09–0.12	0.07–0.11
patisserie	–	0.07–0.10	0.06–0.09
container washing	0.05–0.08	0.04–0.06	0.03–0.05
office – kitchen manager	0.03–0.05	0.02–0.03	0.02–0.03
kitchen area	0.60–0.80	0.50–0.70	0.40–0.60
dishwasher	0.10–0.12	0.09–0.11	0.08–0.10
servery/waiters' equipment	0.06–0.08	0.08–0.10	0.10–0.15
staff washing facilities and WC	0.40–0.50	0.30–0.40	0.28–0.30
= in total	1.60–2.10	1.50–2.00	1.30–1.80

③ Kitchen area = space requirement (m²/seat)

③ Kitchen areas – space requirement (m²/seat)

RESTAURANT KITCHENS

The trend away from conventional restaurants to those offering a wide range of gastronomy not only affects the planning of dining rooms but also of kitchens. Small and medium-sized restaurant kitchens play a very important role here, and the following details are primarily aimed at such restaurants.

In the 'Gastronorm' system, the dimensions of containers, tables, shelves, equipment and crockery, as well as built-in units, are all based on a 530 mm × 325 mm module.

The function and organisation of the restaurant kitchen is summarised in ① + ②. The capacity of the kitchen is primarily dependent on the number of customer seats, customer expectations (type, extent and quality of the meals offered), and the proportion of raw materials which have to be freshly prepared (as opposed to ready-prepared food), as well as the frequency of customer changes over the whole day or at busy periods (consumer frequency).

In fast restaurants about three seat changes per hour can be expected; in conventional restaurants only about two. In speciality and evening restaurants customers stay on average 1.3–2 hours.

The percentage of the whole floor area required for each section → ④, and the detailed requirements for special purposes → ③, can be calculated in relation to small, medium and large kitchens.

Aisle widths in storage, preparation and production areas are different according to whether they are purely traffic routes, or if they also lead to service areas. Working aisle widths should be 0.90–1.20 m, local traffic routes with (occasional) additional usage 1.50–1.80 m and main traffic routes (transport and two-way through traffic) 2.10–3.30 m. Aisle widths of 1.00–1.50 m should be sufficient for small to medium-sized restaurant kitchen areas.

area	proportion in %
goods deliveries, including inspection and waste storage	10
storage in deep freeze, cold and dry rooms	20
daily store	
vegetable and salad preparation kitchen	2
cold meals, desserts	8
cake shop	8
meat preparation	
cooking area	2
washing area	8
walkways	10
staff rooms and office	15
	100

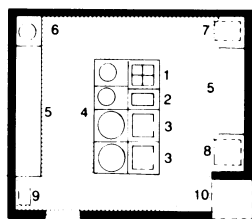
④ Basis for dimensions and space requirements

empties	lift	deliv- eries	waste	staff changing room
dry goods store	cold room	vege- tables	office	washroom
daily store	meat prep.	veg prep.	potato prep.	toilets
pot washer	hot dishes	cold dishes		restroom
dishwasher	servery, waiter's walkway			cake shop
				coffee room
	buffet		bar servery	

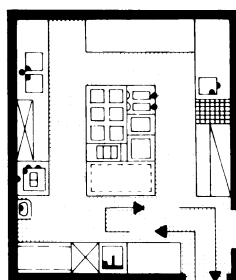
⑤ Kitchen area = classification relationships

⑤ Kitchen areas – classification relationships

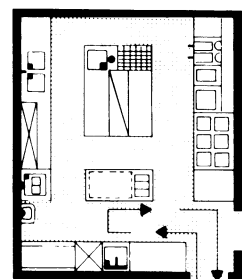
RESTAURANT KITCHENS



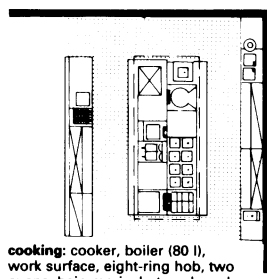
1. Basic organisation of kitchen → 2 – 3



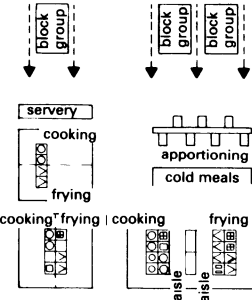
2. Kitchen for restaurant with 60–100 seats



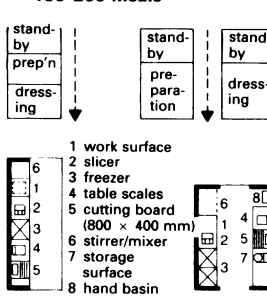
3. Kitchen for restaurant with 60–100 seats



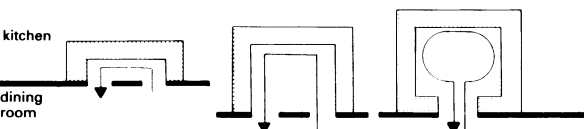
4. Restaurant kitchen for 150–200 meals



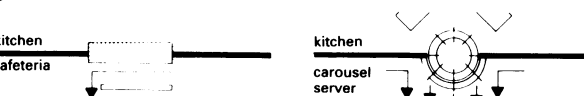
5. Function and organisation of kitchen



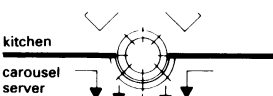
6. Organisation of cold meal kitchen



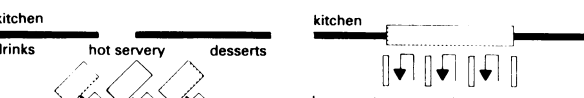
7. Servery, waiter's walkway



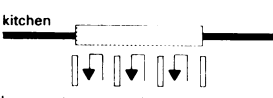
8. Self-service restaurant



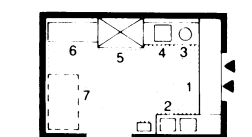
9. Self-service restaurant



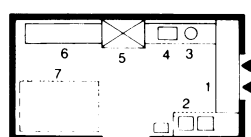
10. Free-flow restaurant



11. Self-service restaurant



12. Basic solution – dishwashing area



13. Basic solution – dishwashing area

'Hot kitchens' contain finishing zones and some or all of the following equipment depending on their main function: cooker (two to eight rings), extractor hood, water boiler, automatic cooker, steamer, automatic steamer, pressurised steamer, convection ovens, water bath (bain-marie), baking and roasting oven, frying and grilling plates, frying pans, double-decker roasting oven, deep fryer, salamander, air circulation equipment (for deep-frozen goods), microwave oven and automatic through-flow frying and baking oven. Large automatic units are only found in very large kitchens. The main units should be arranged in a block in kitchens serving more than 100–200 meals or with more than 30m² of space available. In even larger kitchens, over 50m², finishing groups can be arranged as double blocks. Storage space and working surfaces should be conveniently placed between the units at the end of blocks → ① – ⑤.

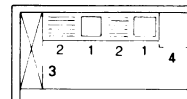
In the 'cold kitchen', the layout should be logically planned in parallel with the hot kitchen and convenient for the (common) servery and bread area. The main fittings for a cold kitchen are a day refrigerator under/over the cold table, diverse cutting machines (bread, meats and cheese), mixing machine, scales, cutting boards, salad table with a lower cold cabinet, toaster or salamander, microwave, and sufficient working and storage surfaces → ⑥.

The meal servery for a restaurant kitchen with a counter or bar serving point is best located between the preparation area and the dining room. There should be an adequate storage surface, a hot cabinet with heated table plates, and a cool zone for cold meals. A crockery shelf or attachment, a cutlery container, and basket and plate dispensers are also necessary for large restaurants.

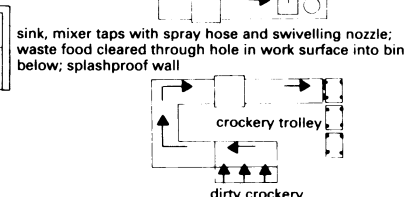
It is important to separate pot washers and dishwashers. With waiter service, crockery is returned via the servery in the waiter's own area → ⑫ – ⑮. There should be one or two rinsing sinks with draining surfaces, storage surfaces and shelves for pot washers. All other items should go into automatic dishwashers of suitable capacities fitted below the work surfaces. Rules should be laid down for loading and operating the dishwashers. Through-flow and circulation units are also necessary. Provide side storage and working surfaces for returns, and sorting, soaking and locating surfaces for crockery → ⑫ – ⑭.

About 10–15% of the kitchen area should be reserved for offices and staff rooms. Kitchen staff must be provided with changing rooms, a washroom and toilets. If more than ten staff are employed, rest and break rooms are required. Changing and social rooms should be close to the kitchen to avoid the staff having to cross unheated rooms or corridors (there is an increased risk of draughts in hot workplaces). More than 6m² should be provided for the changing room, with four to six air changes per hour as well as visual screening. Provide a well-ventilated, lockable cupboard for each worker. In large kitchens there may be cupboards for street and working clothes. The minimum requirements of local workplace regulations should be used for the dimensions and fittings of the washing and toilet areas. Other guideline values for toilet systems are 5–6m² per WC seat and wash basin unit, and about 5.5m² per wash basin and shower unit, for five or more male or female workers.

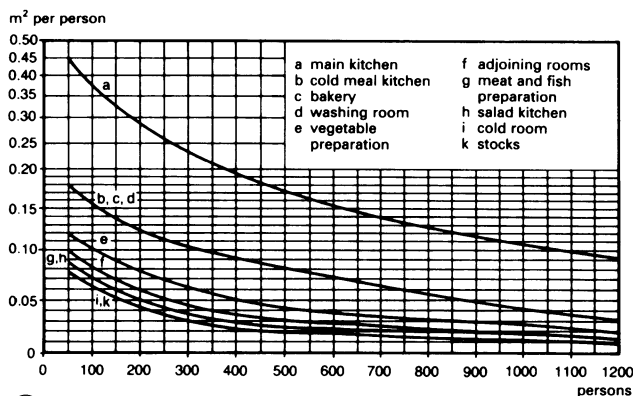
Large kitchens must be equipped with a mechanical ventilation system according to current guidelines. Waste air must be extracted at each cooking point, with extraction pipes to the outside via a ducting system. Fresh air must be drawn in, i.e. recirculated air is not permitted.



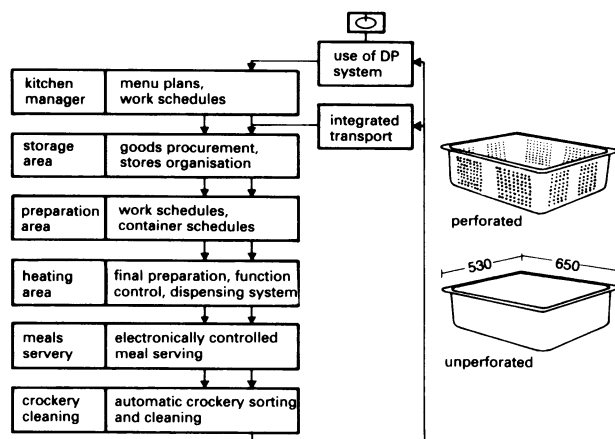
14. Basic solution – pot washing



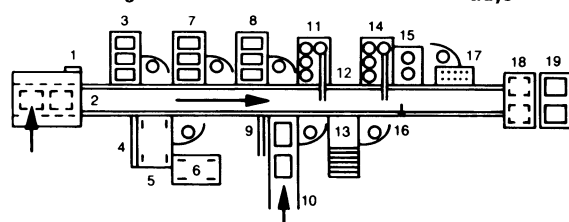
15. Functions and elements of the washing area



1 Kitchen and work space requirements in restaurants and hotels
(a-k = m² per person in single room group)



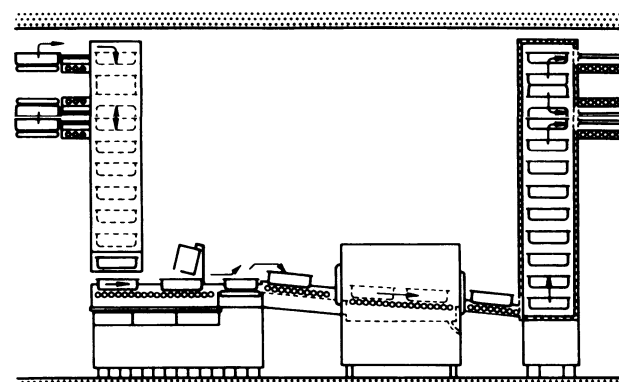
2 Programmed kitchen function diagram



3 Serving trays

- 1 automatic crockery dispenser and tray unloader; dispensing from heated cabinet below; punched card reading device
- 2 meal distribution conveyor
- 3 electronically controlled serving trolley for potatoes
- 4 illuminated display for desserts and salads
- 5 rack trolley for desserts
- 6 rack trolley for salads
- 7 electronically controlled serving trolley for vegetables
- 8 electronically controlled serving trolley for meat
- 9 illuminated display for special diets
- 10 supplementary conveyor for special diets
- 11 automatic sauce dispenser
- 12 cutlery dispenser
- 13 soup plate dispenser
- 14 automatic soup dispenser
- 15 dispenser for heat-retaining container lids
- 16 automatic closing device for soup plate covers
- 17 control desk for diet assistant
- 18 automatic tray stacker
- 19 tray distribution trolley

4 Meal distribution system



5 Container movement in the Contiport system

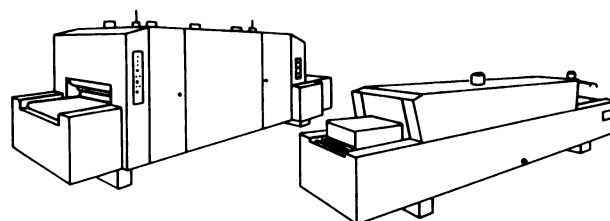
LARGE KITCHENS

Group-catering for large numbers of people in office blocks, hospitals, factories, etc., requires labour-saving mechanisation, electronic data processing (DP) and automatic units, i.e. the 'programmed kitchen' from the meals plan, through goods procurement to meal distribution and crockery cleaning → ② for more than 800-1000 table places and different dishes. Preparation tables and the meal servery are heated by steam or electricity. The surface temperature of table plates should be 60°C.

The advantage of such a system is that data about calorie content, nutritional value, vitamins and minerals, etc., are saved and are immediately available, and stores levels and order requirements are automatically updated. The preparation machinery is in continuous use, and the work sequence is controlled on a time basis. This covers the transport → ⑤ of unit containers → ③, an automatic through-flow roaster → ⑥ and cooker → ⑦, modern cooking processes for potatoes and vegetables, quick frying methods using little fat, fish cooked in a water bath, and thermal grilling. The automatic equipment is arranged in a flow system from loading to distribution → ④. Heating is by electricity or gas.

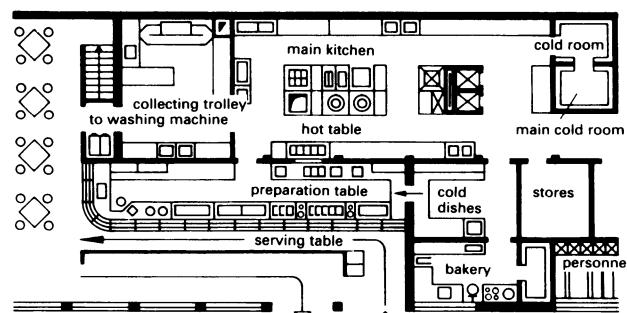
These serving systems are for pure catering operations such as hospitals, residential homes, canteens and cafeterias → ④, ⑧, ⑨.

Fully automatic crockery cleaning is also installed, using sorting and clearing equipment, and automatic removal of cutlery, dishes and cups. The cleaning and drying system should be suitable for the type of crockery, and automatic clearance of tray trolleys. Return transport of used crockery is via a transport conveyor to the washing kitchen → ⑨.

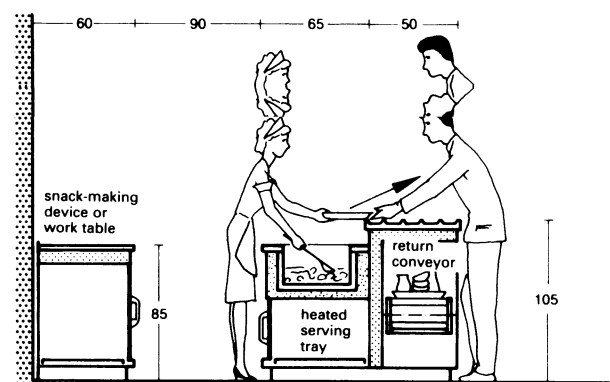


6 Automatic through-flow oven for longer roasting times

7 Automatic through-flow cooker

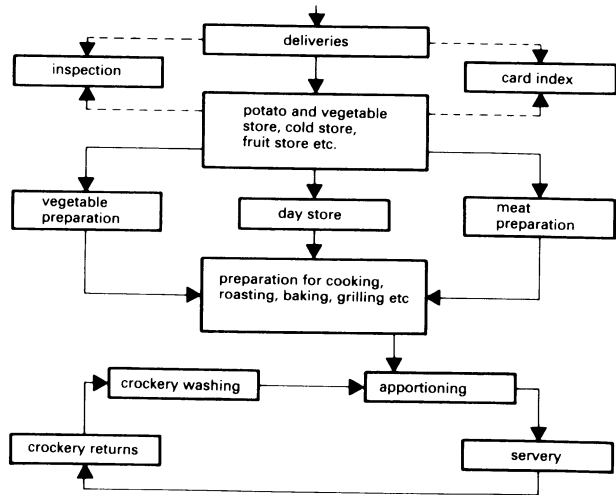


8 Cafeteria serving cold and hot meals → ⑨

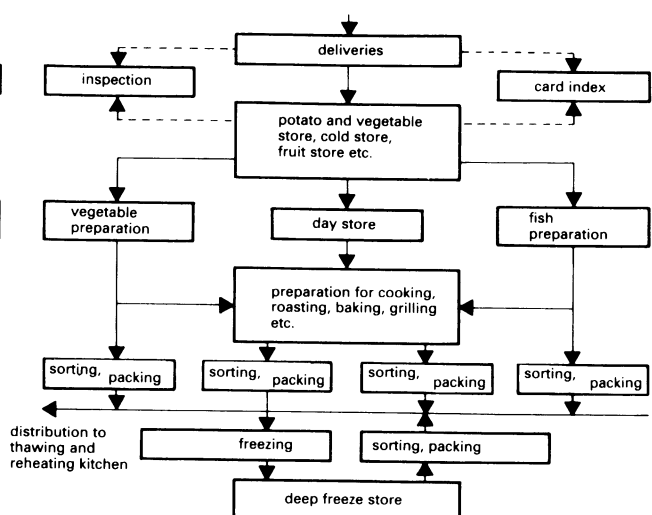


9 Cafeteria: meal servery → ⑧

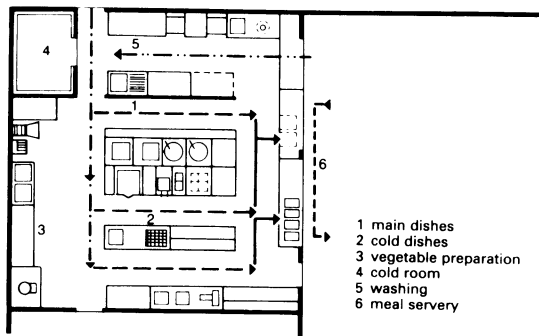
LARGE KITCHENS



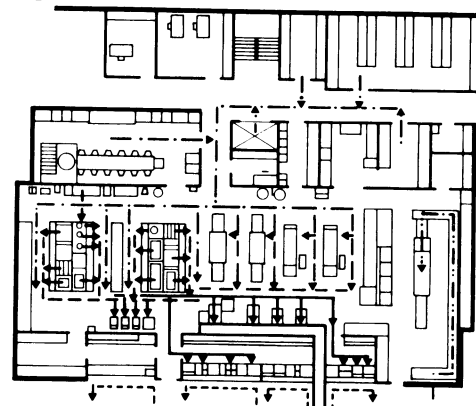
① Conventional kitchen with direct meal service



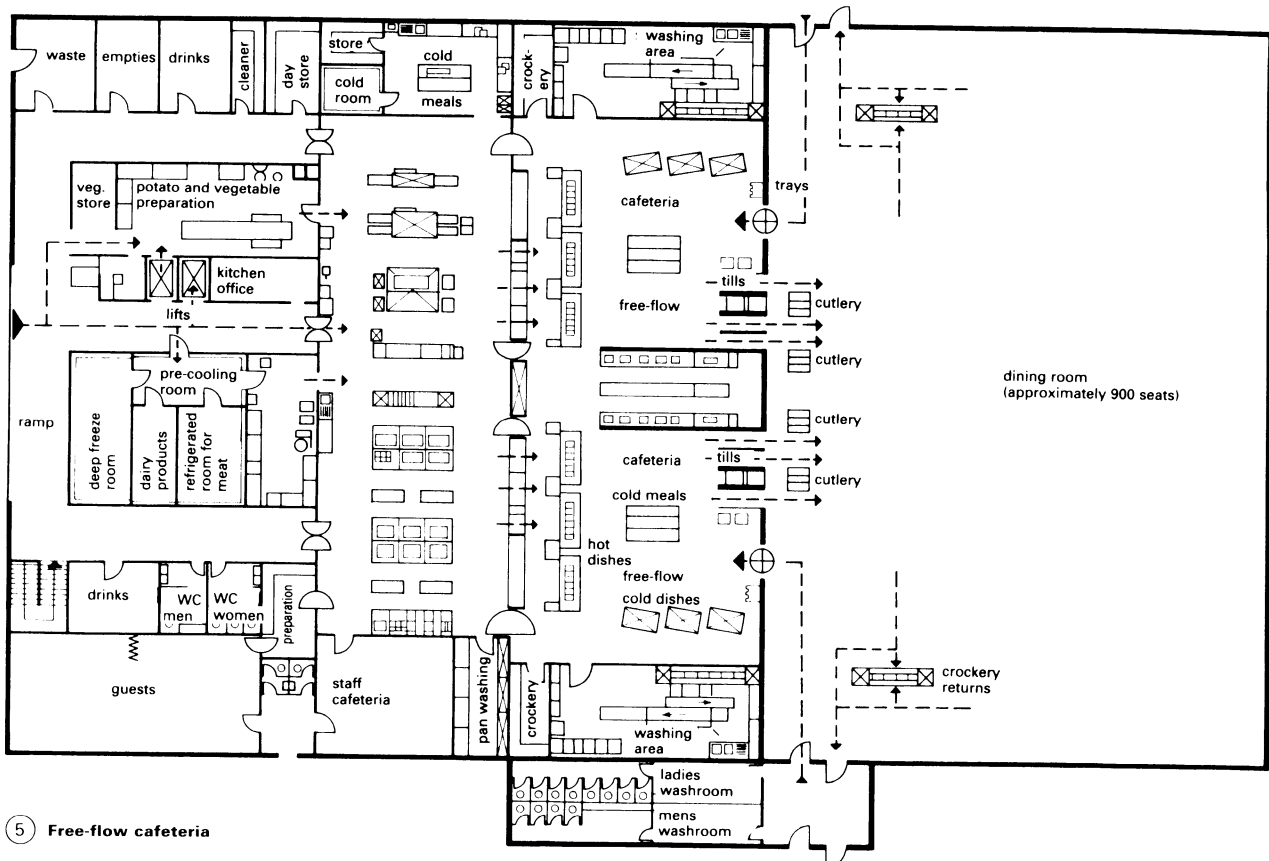
② Central kitchen linked with packing and freezing unit



③ Kitchen for approximately 250 diners



④ Conventional kitchen system



⑤ Free-flow cafeteria