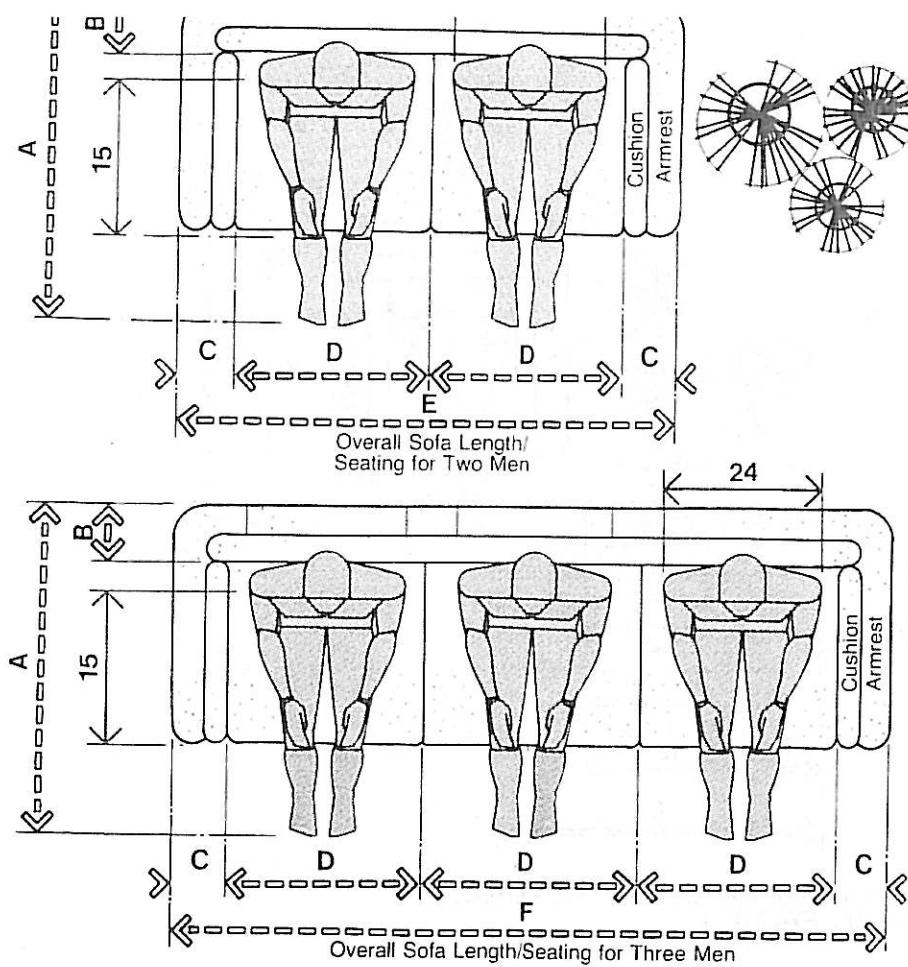
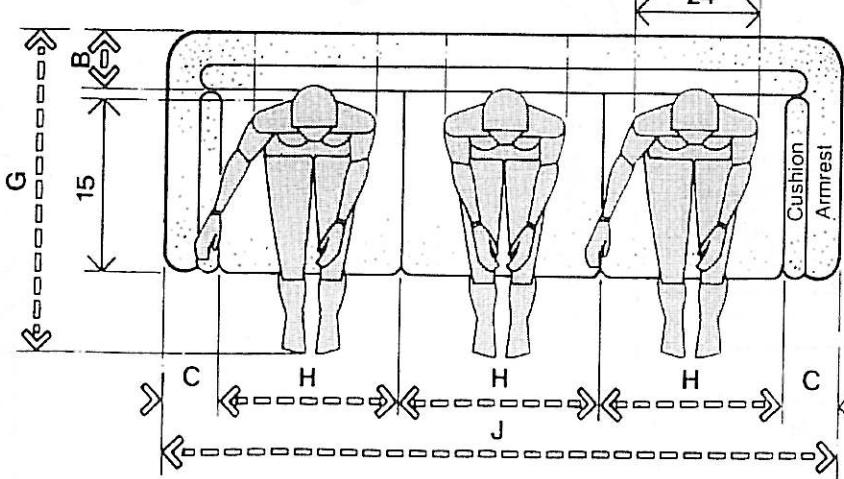
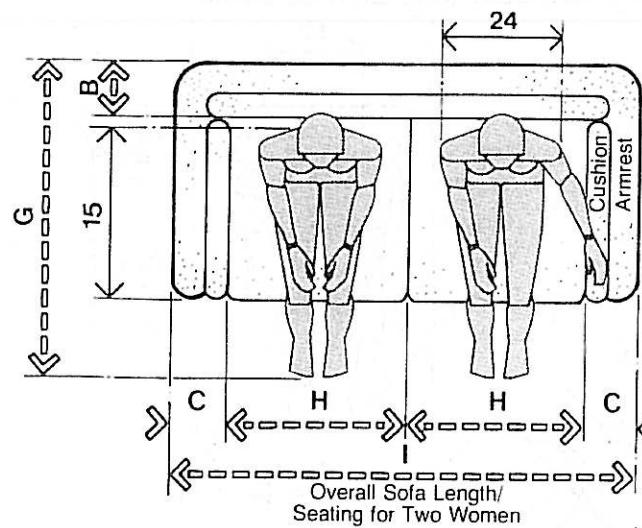


The drawings here examine the relationship of female and male body dimensions to sofa seating, in order to determine how much space the seated body requires. The anthropometric measurements of major interest here are maximum body breadth and buttock-popliteal length.

The top drawing deals with male dimensions; based on 95th percentile data, the maximum body breadth dimension is 22.8 in, or 57.9 cm, with a nude subject. Allowing for clothing and some body movement as well as change in posture and position, a minimum dimension of 28 in, or 71.1 cm, is suggested as a width allowance for a seated person. The overall dimension, therefore, includes the individual width allowances and the width of a sofa arm construction, which obviously can vary depending on personal design preference. A range of 3 to 6 in, or 7.6 to 15.2 cm, is suggested. Using the buttock-popliteal length of the smaller person and adding a similar allowance of 6 to 9 in, or 15.2 to 22.9 cm, for backrest construction as well as a minimum zone in front of the sofa for foot movement, an overall depth dimension of 42 to 48 in, or 106.7 to 121.9 cm, is suggested. The rationale for the drawing at the bottom dealing with female data is the same. The information should prove not only useful in providing a keener insight into the general relationship between body size and furniture but of specific value in establishing preliminary design assumptions for institutional seating in spaces designed exclusively for the use of males or of females. In spaces where seating is to be used by both sexes, the larger dimensions should apply.



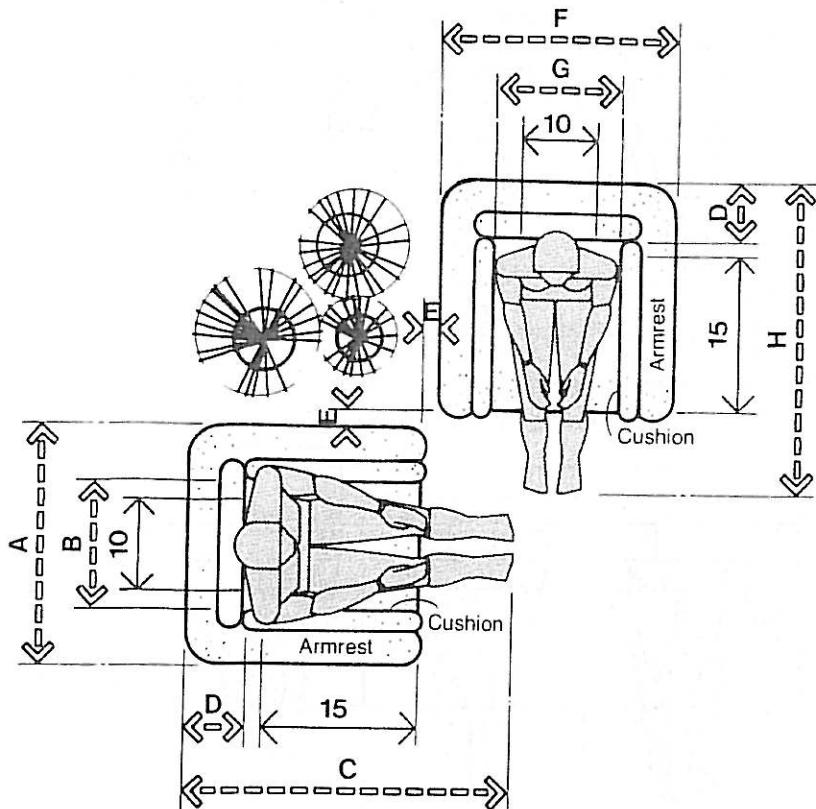
SOFA SEATING / MALES



SOFA SEATING / FEMALE

	in	cm
A	42-48	106.7-121.9
B	6-9	15.2-22.9
C	3-6	7.6-15.2
D	28	71.1
E	62-68	157.5-172.7
F	90-96	228.6-243.8
G	40-46	101.6-116.8
H	26	66.0
I	58-64	147.3-162.6
J	84-90	213.4-228.6

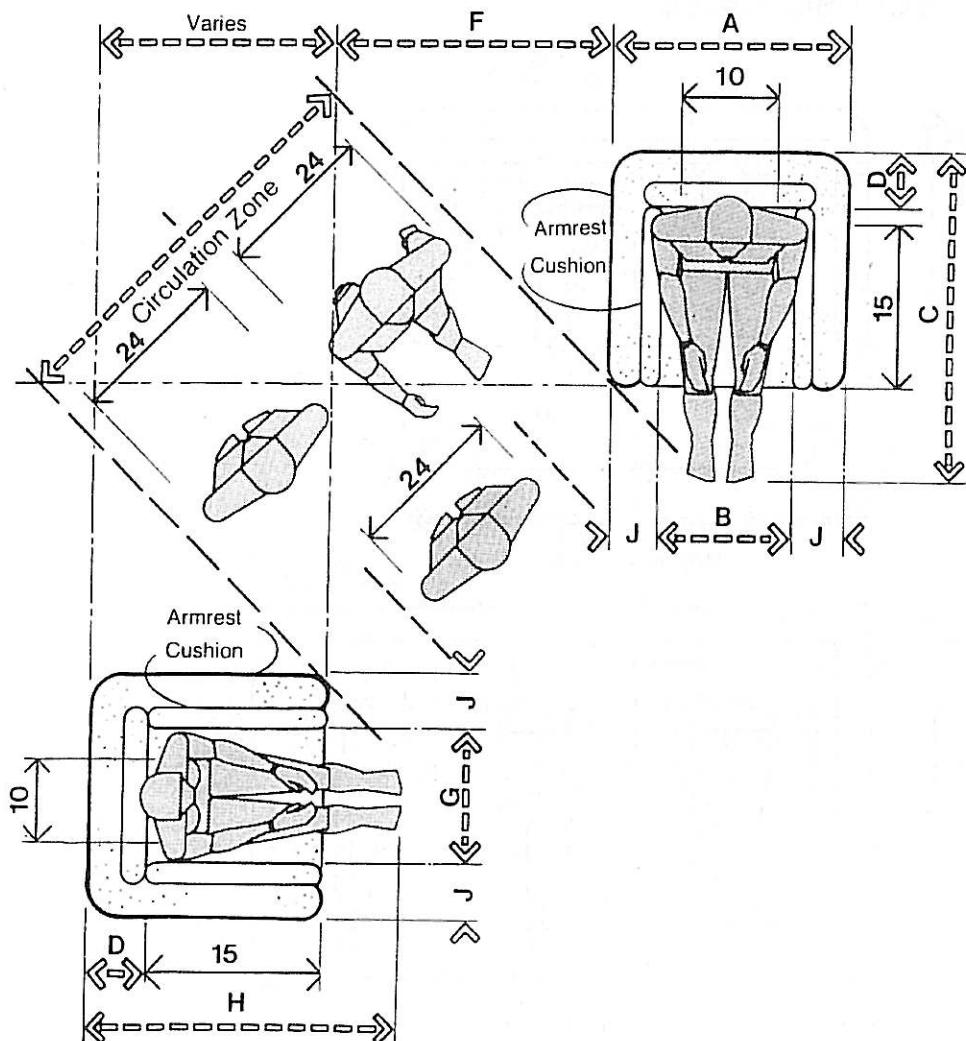
2.1 LIVING SPACES



**CORNER LOUNGE CHAIR SEATING/
MALE AND FEMALE**

The top drawing examines the relationship of the female and male body dimensions to arm chair seating in order to determine the amount of space the seated body requires. The rationale is similar to that in dealing with sofa seating, outlined on the preceding page.

The bottom drawing is not intended to suggest a specific layout for a conversational grouping, and therefore should not be taken literally. Nor is it suggested that special female and male seating be provided in the same living space. The drawing is essentially informative and its purpose is to suggest allowances for comfortable circulation relative to corner lounge seating situations. The key consideration anthropometrically is maximum body breadth data. Since clearance is involved, the data related to the larger person rather than the smaller should be used.



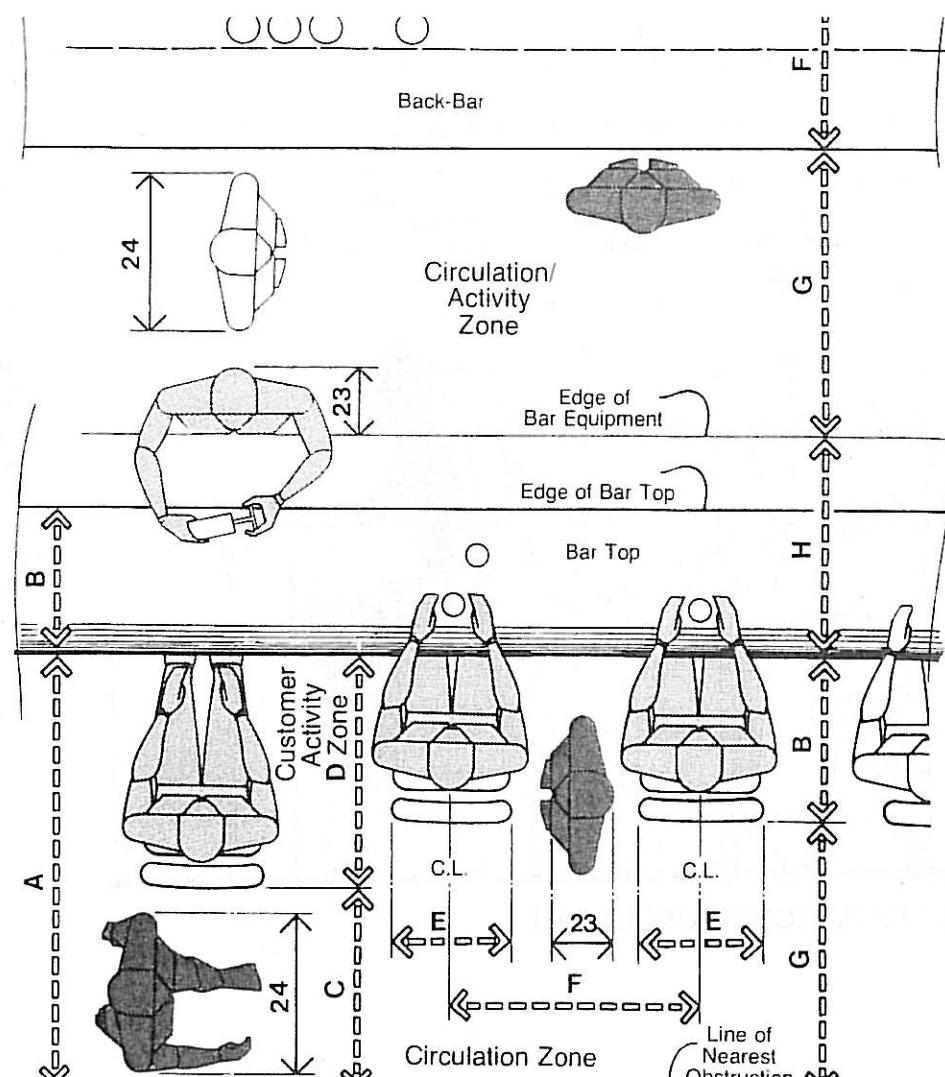
CORNER LOUNGE SEATING WITH CIRCULATION

	in	cm
A	34-40	86.4-101.6
B	28	71.1
C	42-48	106.7-121.9
D	6-9	15.2-22.9
E	3	7.6
F	32-38	81.3-96.5
G	26	66.0
H	40-46	101.6-116.8
I	48-60	121.9-152.4
J	3-6	7.6-15.2

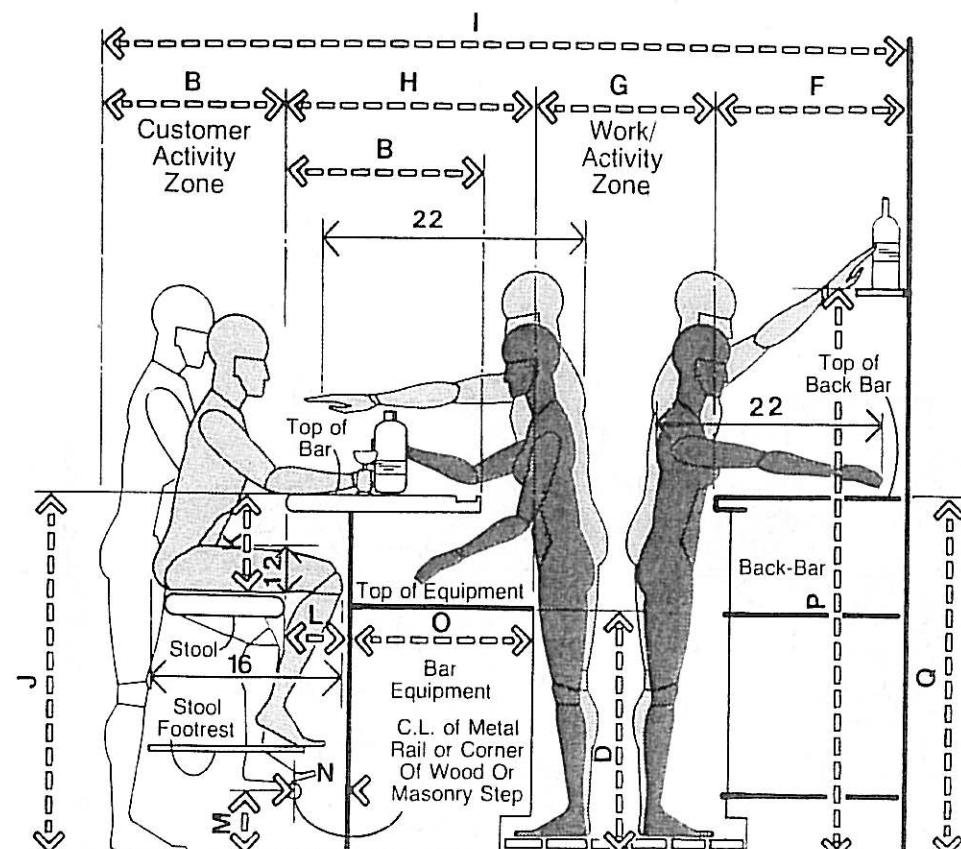
5.1 BARS

The distance between bar and back-bar should allow adequate workspace. A minimum of 36 in, or 90 cm, should provide space for one bartender to serve and another to circulate behind him. Maximum body depth and maximum body breadth are the primary anthropometric considerations in establishing clearance. A one-bartender operation would require a 30-in, or 75-cm, clearance.

In regard to bar stools, clearance between the stool seats is more critical than center line spacing, and it should allow patrons of larger body size a comfortable side approach and departure from the stool without body contact with the next person. A 12-in, or 30-cm, wide stool on 24-in, or 61-cm, centers, which is quite common, will allow only less than 5 percent of male users access to the stool without disturbing the next patron, while a 30-in, or 75-cm, spacing will accommodate 95 percent of the users. The tradeoff, however, would be the loss of two seats for every 120 in, or 300 cm, of bar length. A spacing of 12-in stools on 28-in, or 70 cm, centers is suggested as a compromise. The ultimate decision is an individual one and must reconcile human factors with economic viability.



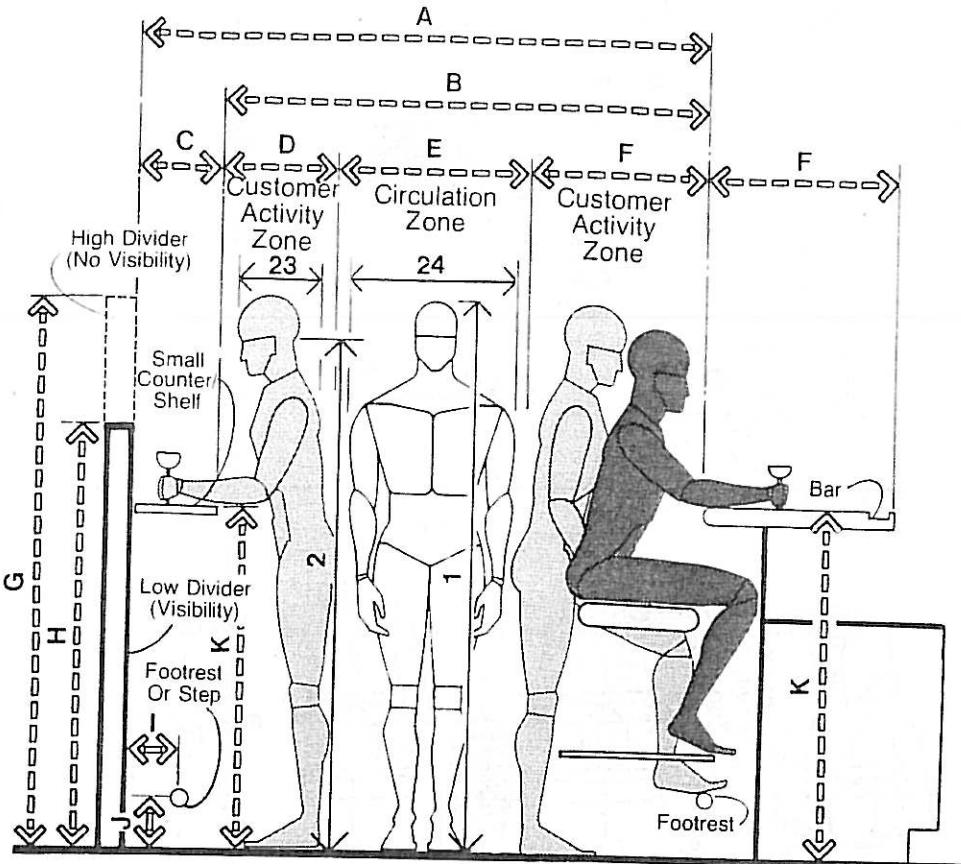
BAR AND BACK-BAR



BAR / SECTION

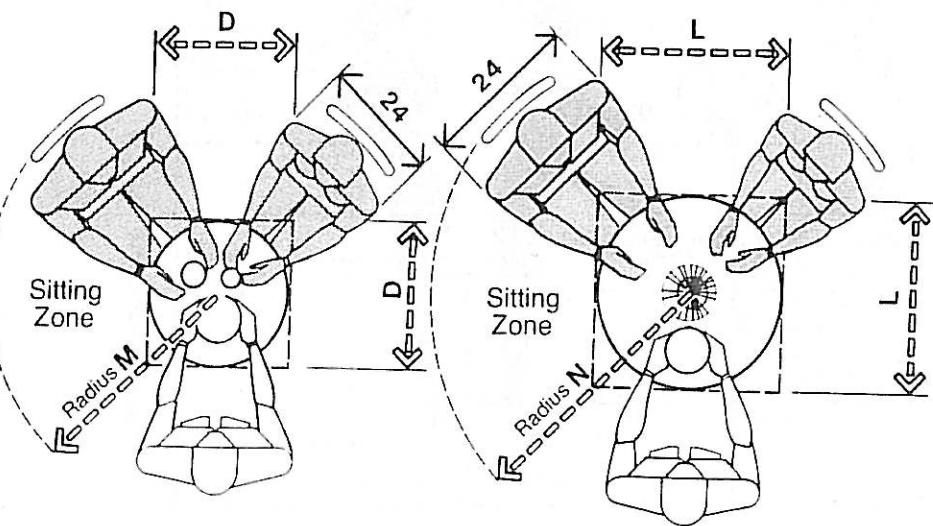
	in	cm
A	54	137.2
B	18-24	45.7-61.0
C	24	61.0
D	30	76.2
E	16-18	40.6-45.7
F	24-30	61.0-76.2
G	30-36	76.2-91.4
H	28-38	71.1-96.5
I	100-128	254.0-325.1
J	42-45	106.7-114.3
K	11-12	27.9-30.5
L	6-7	15.2-17.8
M	7-9	17.8-22.9
N	6-9	15.2-22.9
O	22-26	55.9-66.0
P	60-69	152.4-175.3
Q	36-42	91.4-106.7

5.1 BARS



BAR / CLEARANCES PUBLIC SIDE

To ensure proper circulation and interface, adequate clearances in front of the bar are illustrated in the top drawing. A customer activity zone of 18 to 24 in, or 45.7 to 61.0 cm, should be provided to allow for seating, standing, and access, in addition to a general circulation zone of at least 30 in, or 76.2 cm. If a supplementary drinking surface or shelf is provided, a smaller activity zone of 18 in is suggested in front of the shelf. The shelf can be 10 to 12 in, or 25.4 to 30.5 cm, deep. The bottom drawing shows suggested clearances for 18 or 24 in cocktail tables.



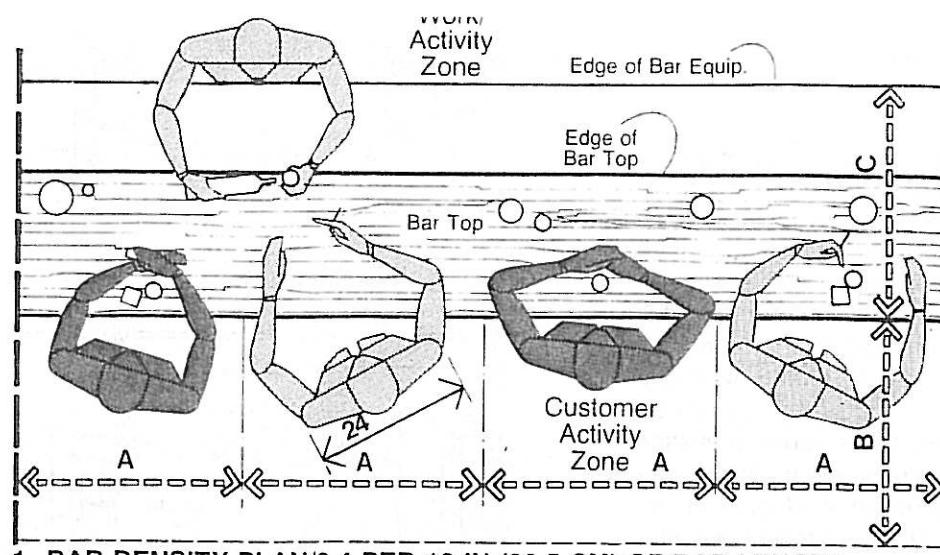
COCKTAIL TABLES / SEATING FOR TWO

	in	cm
A	76-84	193.0-213.4
B	66-72	167.6-182.9
C	10-12	25.4-30.5
D	18	45.7
E	30	76.2
F	18-24	45.7-61.0
G	76	193.0
H	54-56	137.2-142.2
I	6-9	15.2-22.9
J	7-9	17.8-22.9
K	42-45	106.7-114.3
L	24	61.0
M	29-33	73.7-83.8
N	32-36	81.3-91.4

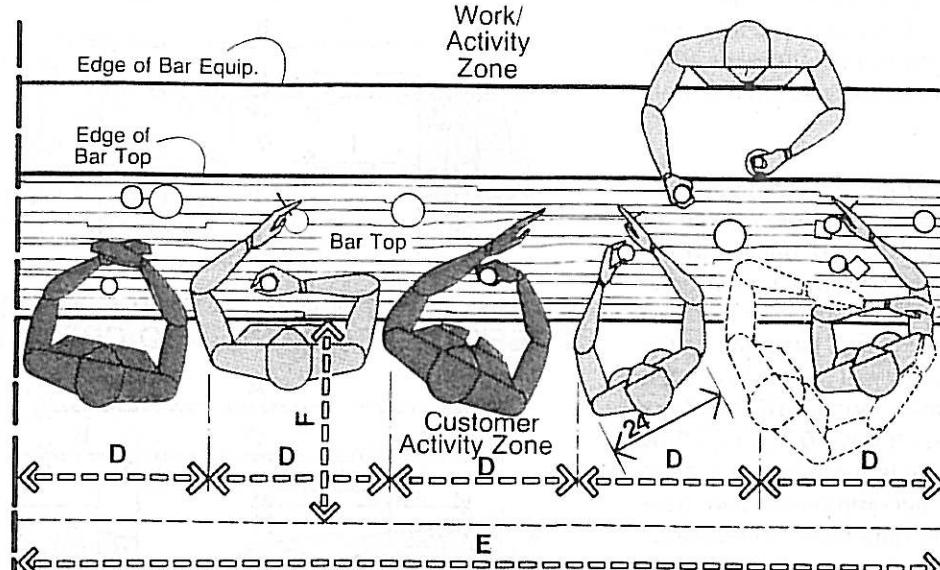
5.1 BARS

Bar seating is a classic example where hidden dimensions, as well as anthropometric factors, must be considered in determining seat spacing. Cultural differences, for example, may dictate proximity between patrons. In one instance closeness may cause discomfort for patrons, and in another case it may be desirable. The density of people and the spacing of seats also impact on social interaction; the greater the density, the greater the probability of such interaction. The drawings, however, deal essentially with the anthropometrics involved and the possible density models. The top drawing illustrates a low-density situation, based on one seated or standing patron per 30 in, or 76.2 cm, of bar length. Such a density model would preclude body contact, allow comfortable changes in body position, and ensure relative privacy.

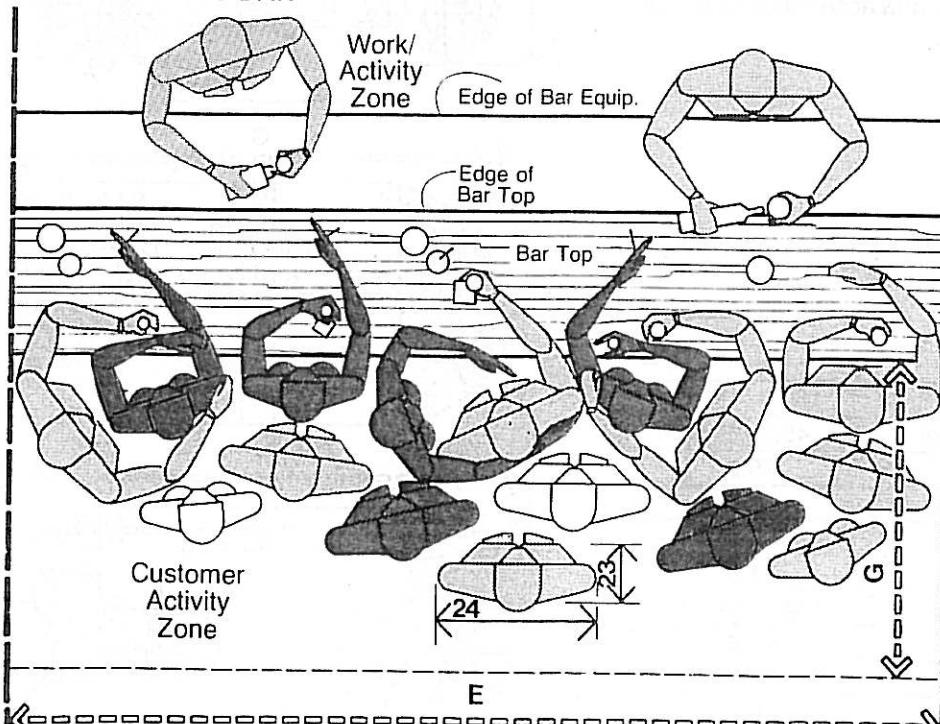
The center drawing illustrates a medium density model, based on 24-in, or 61-cm, spacing; takes occasional pairing into account, as shown by the dotted figure; and allows for occasional body contact and territorial intrusion. The bottom drawing illustrates a high-density model, with patrons standing two to three deep and a density factor of over 1.5 patrons per 12 in, or 30 cm, of bar length.



**1. BAR DENSITY PLAN/0.4 PER 12 IN (30.5 CM) OF BAR LENGTH
ONE DEEP AT BAR**



**2. BAR DENSITY PLAN/0.5 TO 0.7 PER 12 IN (30.5 CM) OF BAR LENGTH
ONE DEEP AT BAR**



**3. BAR DENSITY PLAN/1.5 TO 2.0 PER 12 IN (30.5 CM) OF BAR LENGTH
TWO TO THREE DEEP AT BAR**

BAR DENSITY PLANS

in	cm
30	76-2
24-30	61.0-76.2
28-38	71.1-96.5
24	61.0
120	304.8
18-30	45.7-76.2
36-54	91.4-137.2

5.3 DINING SPACES

The place setting is made up of a studied arrangement of dinnerware and related accessories. During the dining process, it is transformed into a state of disarray, covering a larger zone of the table than at the beginning. This expanded zone occupies a minimum area of 14 by 24 in, or 35.6 by 61 cm. The first group of drawings figuratively labeled shows these zones in relation to tables of varying depth, but of constant minimal width of 24 in, or 61 cm. The center strips represent the surface available for serving dishes, flowers, etc. If we allow for the intrusion of these elements into contiguous zones, a depth of only 40 in, or 101.6 cm, is adequate for their comfortable placement.

In the lower group of drawings these same zones are applied to a 30-in, or 76.2-cm, width. This is related to the maximum body movement involved in the dining activity. Etiquette aside, a 24-in width will allow the arms of the larger user to project beyond the table into circulation lanes. The authors contend that a 30 by 40 in, or 76.2 by 101.6 cm, table is the optimum size to comfortably accommodate two people. The 30-in dimension corresponds to human body breadth. The 40-in dimension allows sufficient room for place setting and accommodates horizontal reach.

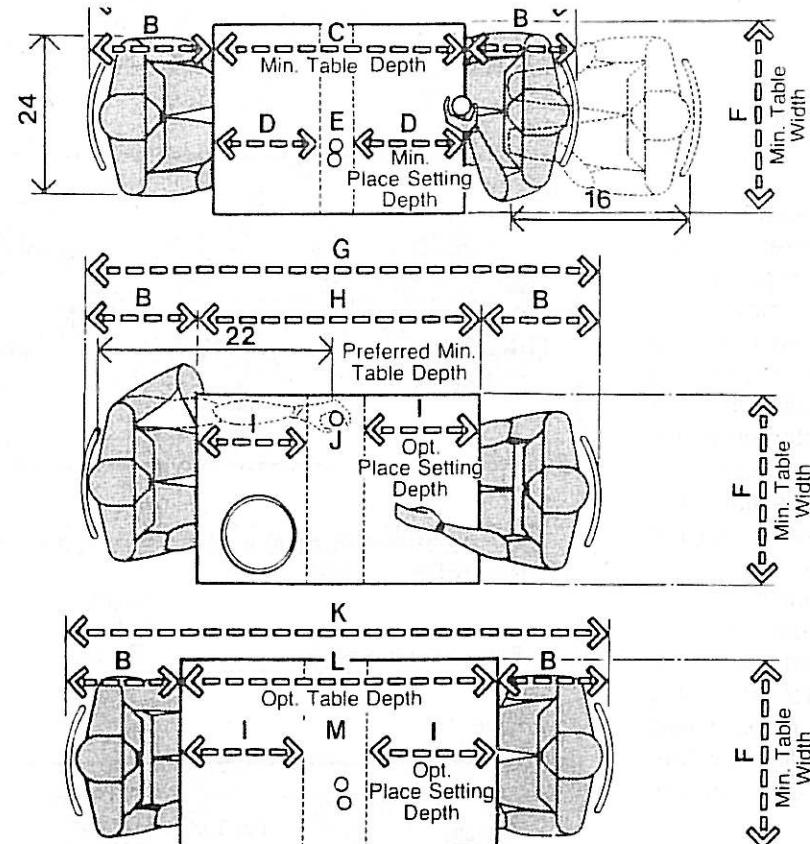
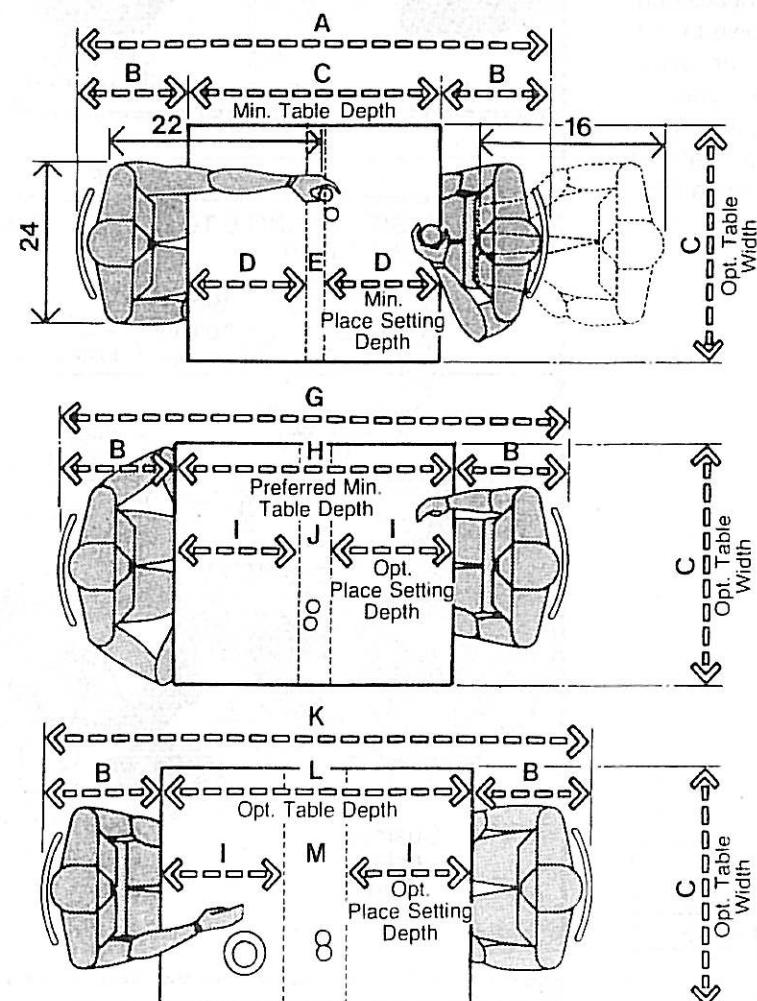


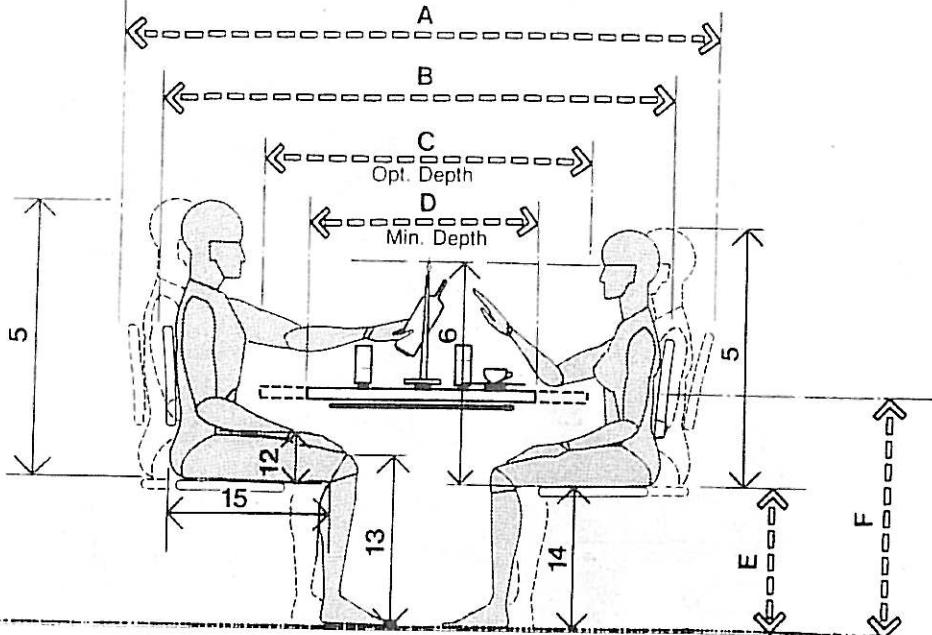
TABLE SIZES/MINIMUM TABLE WIDTH WITH MINIMUM, PREFERRED MINIMUM, AND OPTIMUM TABLE DEPTHS



	in	cm
A	66-78	167.6-198.1
B	18-24	45.7-61.0
C	30	76.2
D	14	35.6
E	2	5.1
F	24	61.0
G	72-84	182.9-213.4
H	36	91.4
I	16	40.6
J	4	10.2
K	76-88	193.0-223.5
L	40	101.6
M	8	20.3

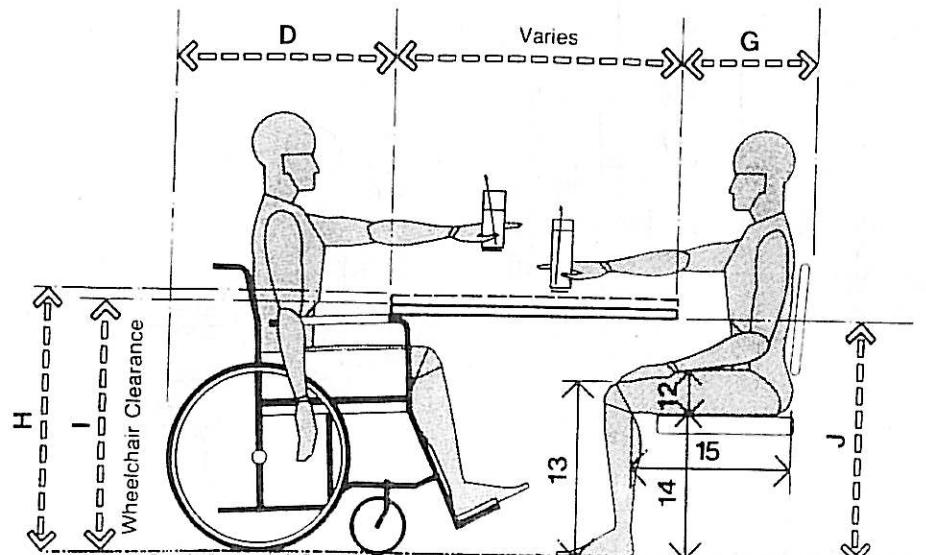
TABLE SIZES/OPTIMUM TABLE WIDTH WITH MINIMUM, PREFERRED MINIMUM, AND OPTIMUM TABLE DEPTHS

5.3 DINING SPACES



**TABLES/MINIMUM AND OPTIMUM DEPTHS/
VERTICAL CLEARANCES**

Both drawings deal with the height and clearance of dining tables. The top drawing relates to the plans on the preceding page and illustrates a 30- and a 40-in, or a 76.2- and a 101.6-cm, table. The portions of the drawing shown in dotted line reflect the 40-in table. The bottom drawing deals with wheelchair access to a dining table. Clearance from the floor to the underside of the table is critical if the wheelchair-bound diner is to be accommodated. Unfortunately, conflicting requirements, depending on the source consulted, show this dimension to be 29 or 30 in, or 72.5 or 75 cm. The American National Standards Institute (ANSI) indicates the required height of the armrest from the floor to be 29 in, or 72.5 cm. Some state legislation requires 30 in, or 75 cm, to the underside of the table. Unfortunately, a 30-in dimension would place the top of the table surface at about 31 in, or 78.7 cm. Such a height would not comfortably accommodate able-bodied diners of smaller size. To raise the seat height would cause the feet of the smaller user to dangle unsupported, and footrests would be somewhat impractical in a public space. Since armrest heights of many wheelchairs do not, in fact, exceed 29 in, or 72.5 cm; and since most models have removable or adjustable arms, the authors recommend a 29-in clearance, instead of 30 in. Such a dimension will accommodate both handicapped and able-bodied users.

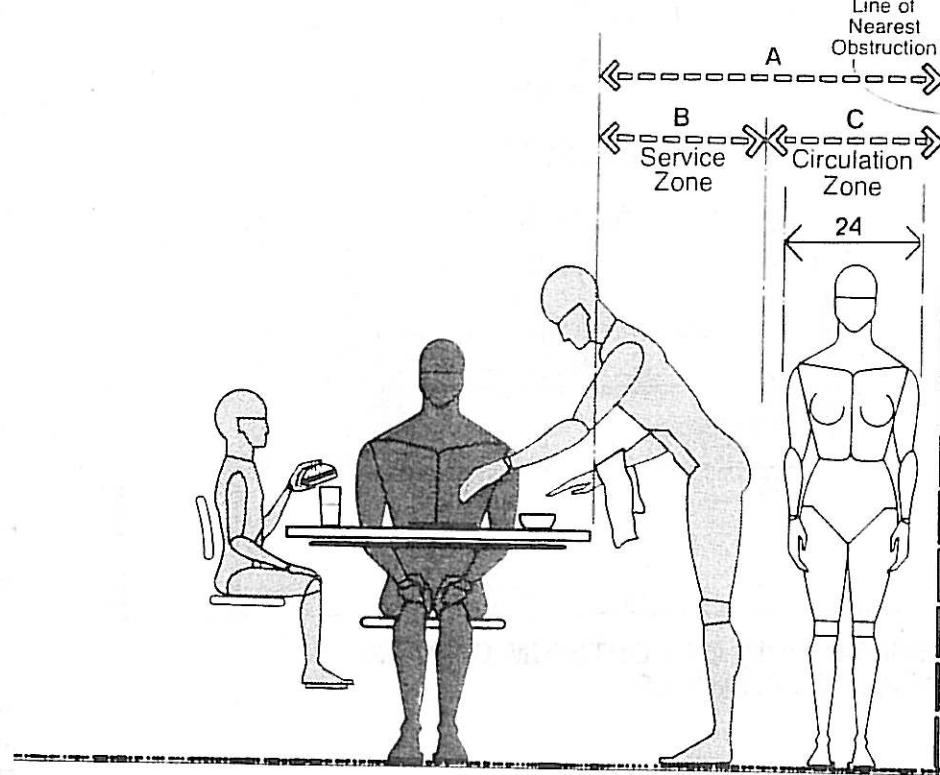


TABLES / WHEELCHAIR CLEARANCE

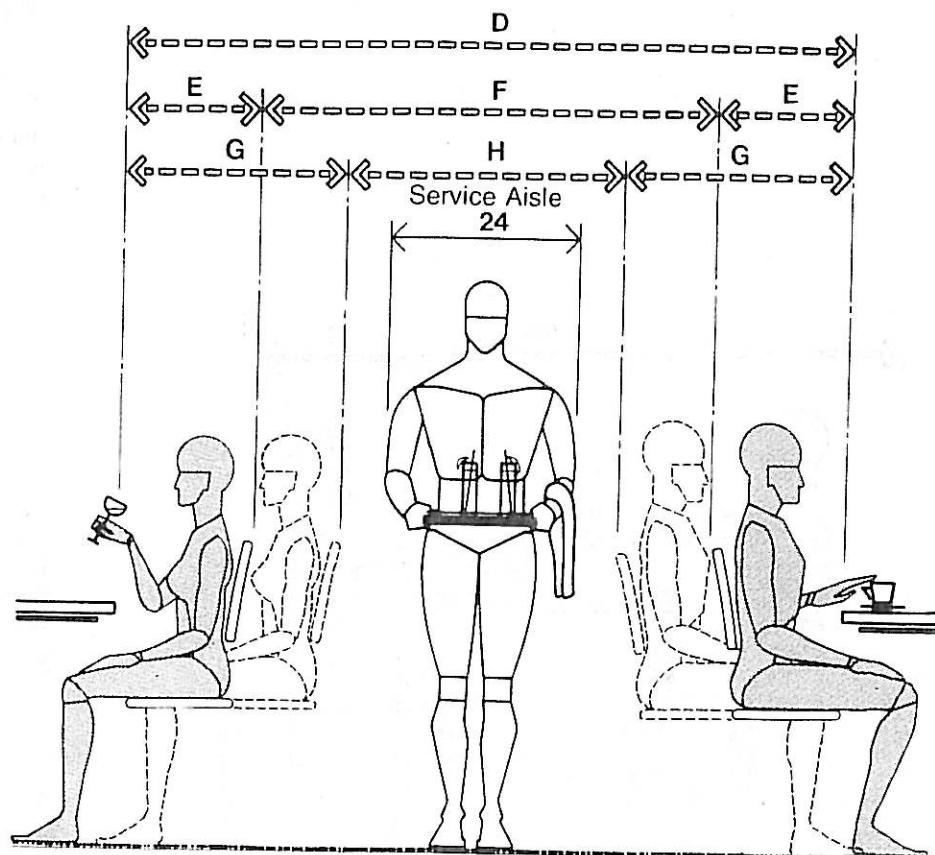
	in	cm
A	76-88	193.0-223.5
B	66-78	167.6-198.1
C	40	101.6
D	30	76.2
E	16-17	40.6-43.2
F	29-30	73.7-76.2
G	18-24	45.7-61.0
H	31	78.7
I	30 min.	76.2 min.
J	29 min.	73.7 min.

5.3 DINING SPACES

The top drawing shows minimal clearance for a combined service and circulation aisle in a low-volume operation. It should be noted that the width indicated will not accommodate two lanes. Either the waiter or customer would have to step aside to avoid body contact. In a high-volume operation, with long aisle lengths, such a clearance would be inadequate. The bottom drawing illustrates a situation where chairs abut a service aisle. The drawing is not intended to serve as a standard for aisle clearance, but merely to indicate all factors involved in establishing that clearance, including intrusions of the chairs into the aisle space. The chair may be relocated as many as four times during the course of the meal. At the beginning, it is much closer to the table. Near the end of the meal in an attempt to relax, one may move the chair away from the table about 24 in, or 61 cm. During intimate conversation it may be brought even closer to the table. Finally, in rising from the chair at the conclusion of the meal, its final location may be as much as 36 in, or 91.4 cm, away. If all intrusions are considered, the clearance between tables could total as much as 108 in, or 274.3 cm, which may prove uneconomical. Yet, to ignore the intrusions would be unrealistic. The authors suggest that, as a reasonable compromise, a clearance between tables of 84 in, or 213.4 cm, be used for preliminary design assumptions.



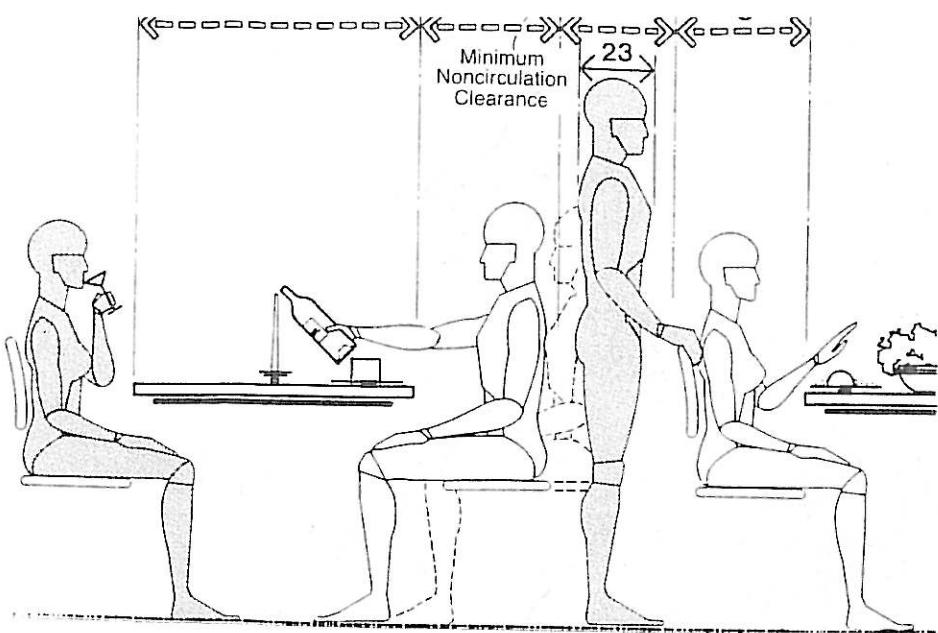
TABLES/CLEARANCE FOR WAITER SERVICE AND CIRCULATION



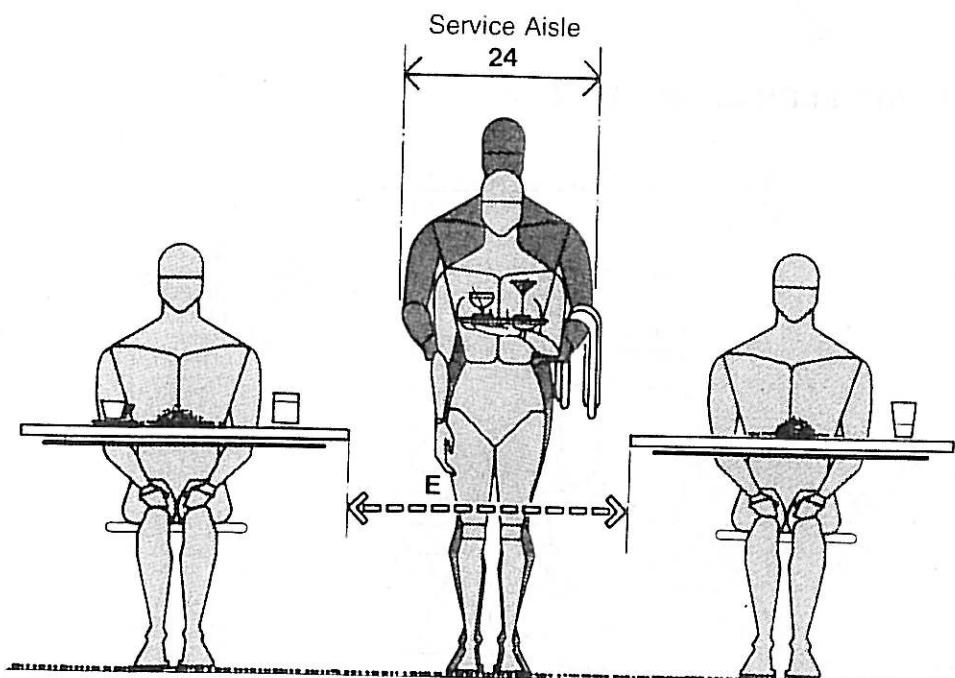
SERVICE AISLE / CLEARANCE BETWEEN CHAIRS

	in	cm
A	48	121.9
B	18	45.7
C	30	76.2
D	96–108	243.8–274.3
E	18–24	45.7–61.0
F	60	152.4
G	30–36	76.2–91.4
H	36	91.4

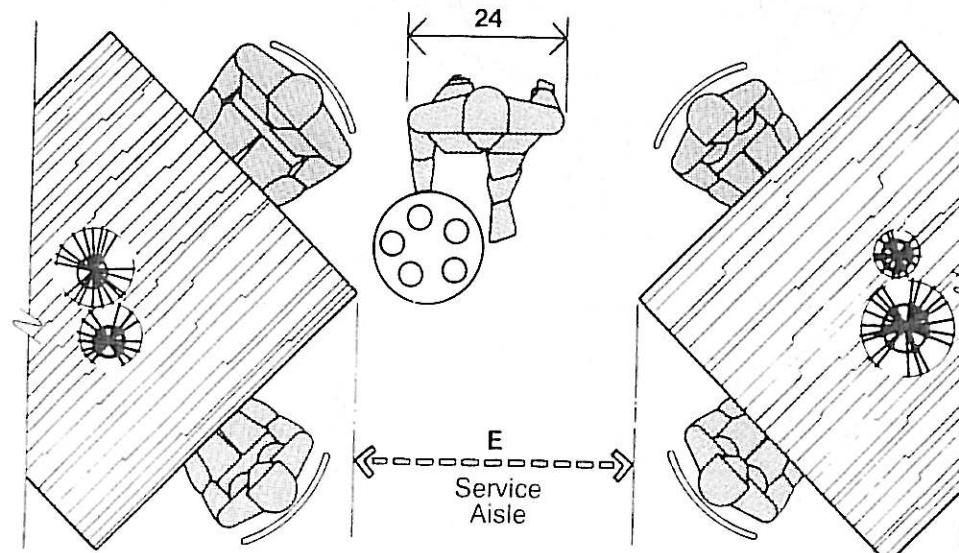
5.3 DINING SPACES



TABLES / MINIMUM CLEARANCE AND NONCIRCULATION ZONES



SERVICE AISLE / CLEARANCE BETWEEN TABLES



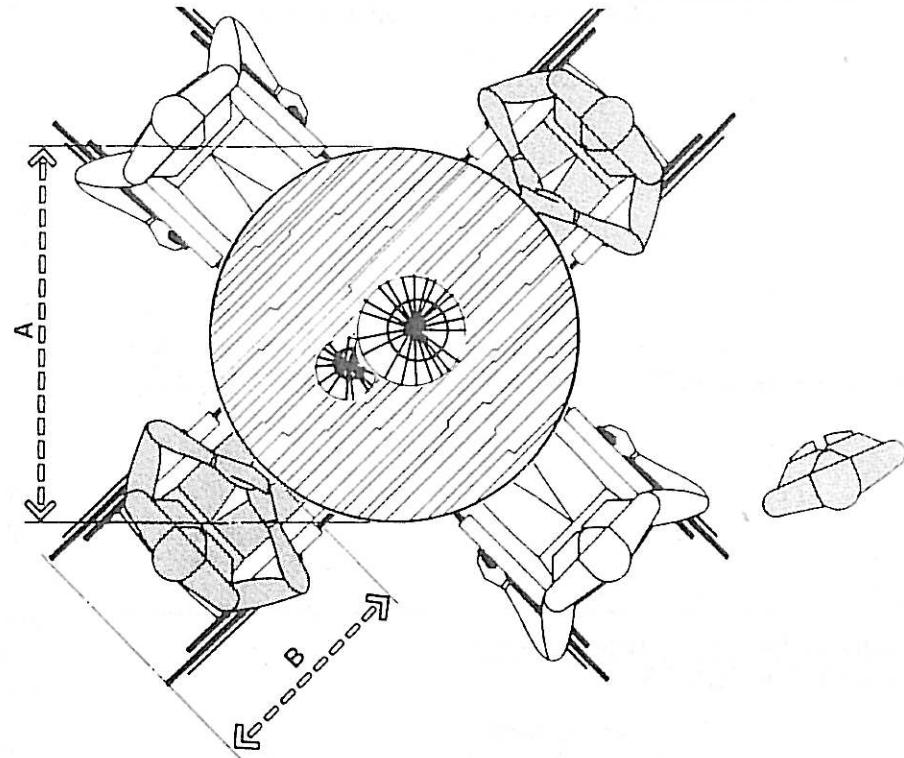
In certain table arrangements, chairs of two adjacent tables may be located back to back and some clearance between them must be provided. This clearance would not be for purposes of public circulation or service, but simply to allow access to the chair. A minimum clearance of 18 in, or 45 cm, from chair to chair, as indicated in the top drawing, or a minimum clearance of 54 in, or 137.2 cm, between tables would be adequate. A 66-in, or 167.7-cm, clearance between tables is preferred. The minimum recommended clearance for a service lane is 36 in, or 91.4 cm, as illustrated in the drawings at the center and bottom. Should the diagonal arrangement in the bottom drawing involve smaller tables, the chairs may project beyond the corners of the table. However, the integrity of the 36-in clearance should be maintained. If the chairs do project, the clearance should be measured between the chairs and not the table corners.

	in	cm
A	54-66	137.2-167.6
B	30-40	76.2-101.6
C	18-24	45.7-61.0
D	18	45.7
E	36	91.4

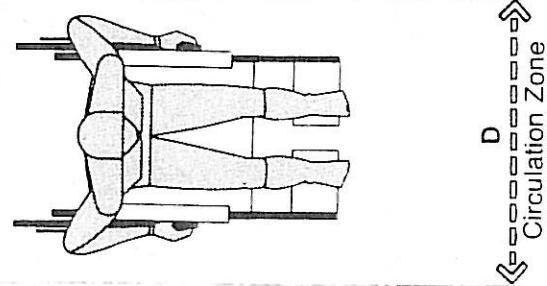
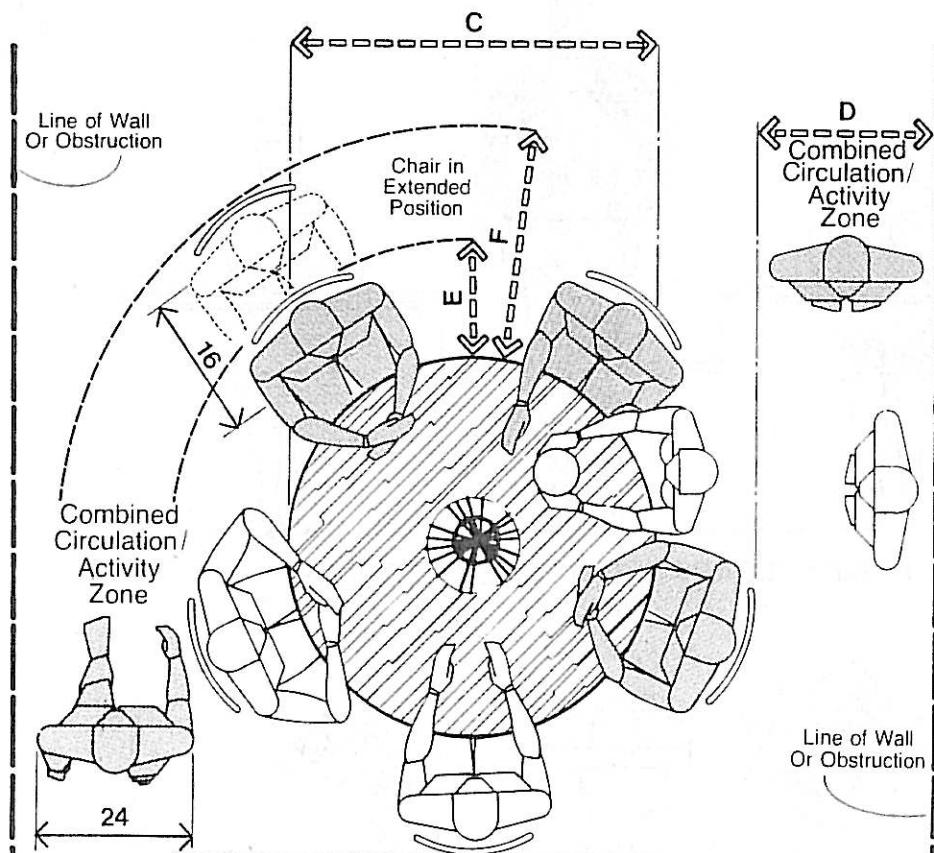
SERVICE AISLE / CLEARANCE BETWEEN TABLE CORNERS



In planning for wheelchair access, the portion of the chair projecting beyond the table will be between 24 and 30 in., or 61 and 76.2 cm. It is suggested that the larger figure be used for preliminary design assumptions. What is not indicated on the drawing are the clearances required for wheelchair maneuvering to and from the table. Turning radii and other information relating to the maneuverability of the wheelchair are provided elsewhere in this book. The drawing at the bottom of the page indicates the clearances required for chair movement in connection with a round table. It should also be noted that the lane width needed to accommodate a wheelchair should be a minimum of 36 in., or 91.4 cm.



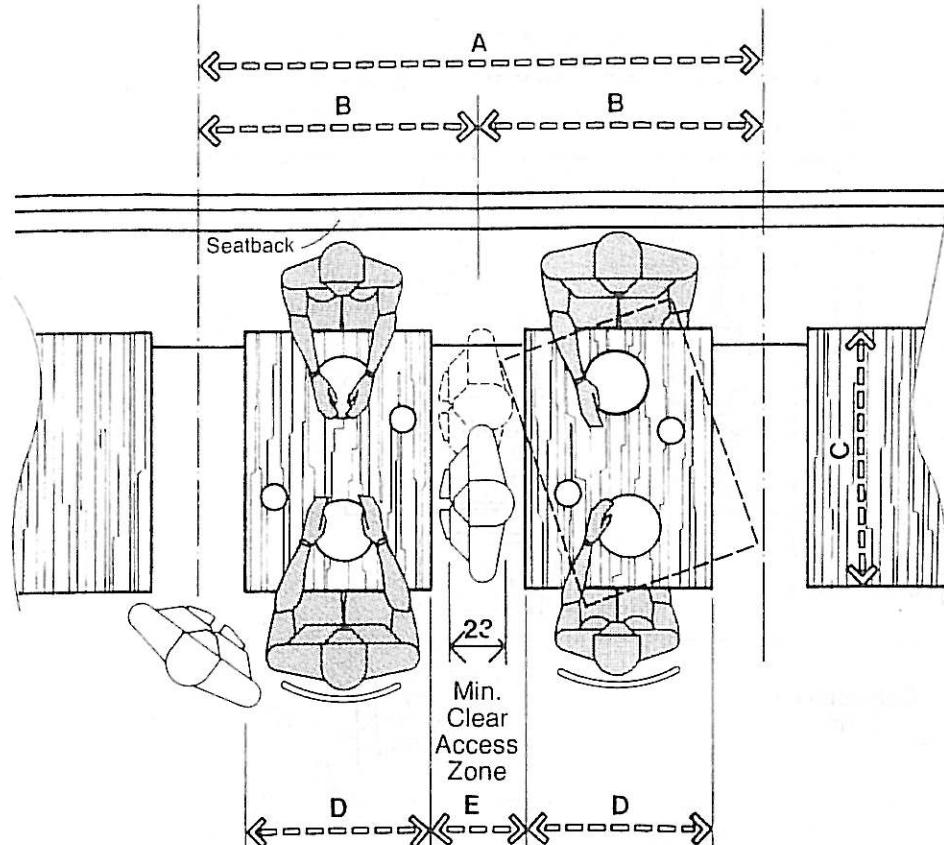
TABLES / WHEELCHAIR SEATING



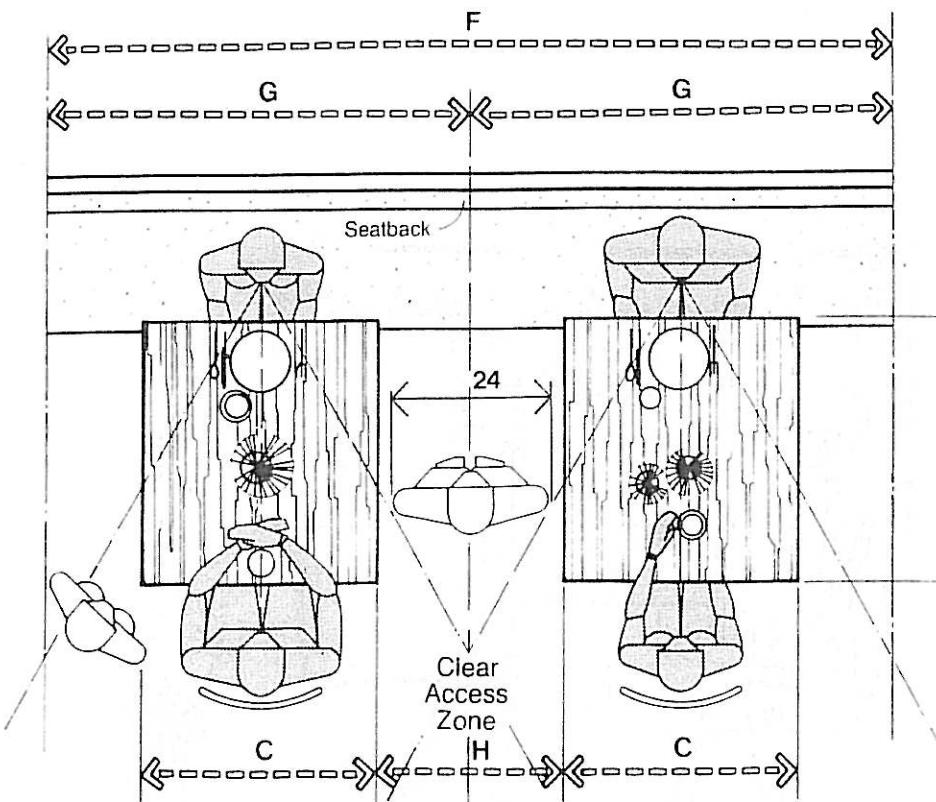
in	cm
48-54	121.9-137.2
24-30	61.0-76.2
48	121.9
36	91.4
18-24	45.7-61.0
30-36	76.2-91.4

5.3 DINING SPACES

Both drawings illustrate the clearances involved for banquette dining arrangements. One of the more critical considerations is access to the banquette seat. The top drawing indicates a minimum clearance between tables. The maximum body depth of the larger person, based on the 99th percentile data, is 13 in, or 33 cm. Allowing for clothing and body movement in addition to the basic body dimension, it becomes apparent that access to the banquette seat for the larger person may require moving the table. The bottom drawing suggests a 24-in, or 61-cm, clearance between tables, which will permit access without disturbing the table location. That spacing will also provide more privacy for the patrons.



BANQUETTE SEATING / MINIMUM CLEARANCES



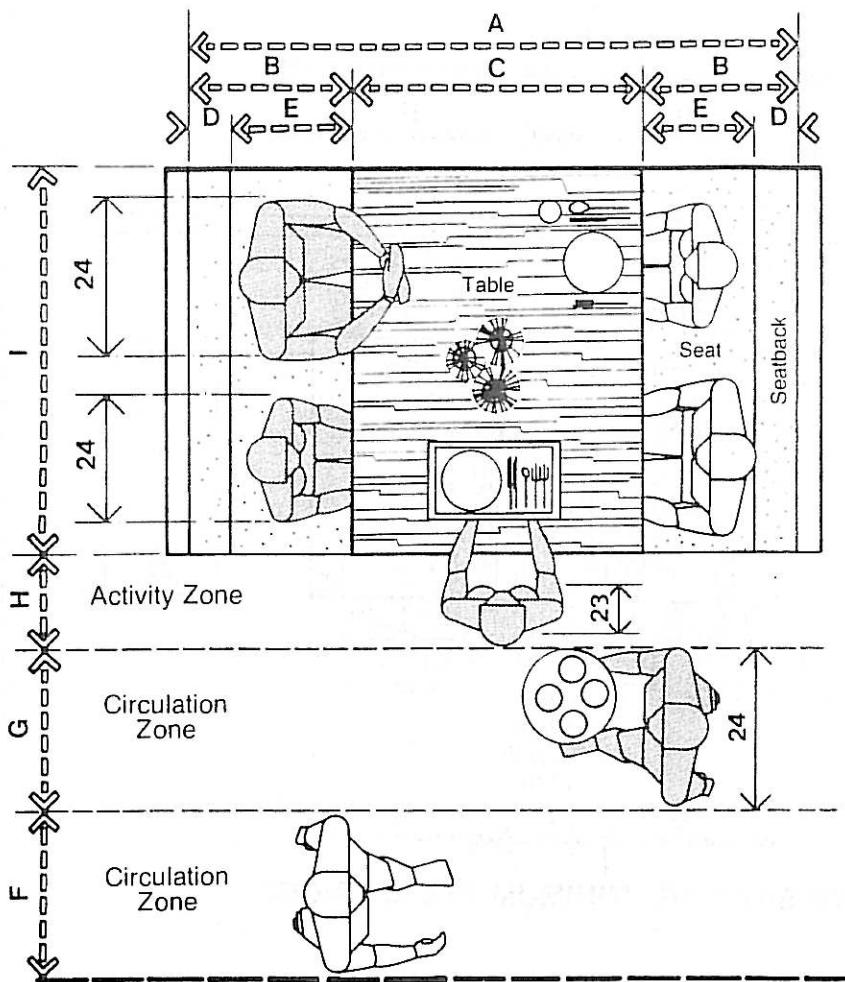
BANQUETTE SEATING / RECOMMENDED CLEARANCES
FOR ACOUSTIC AND VISUAL PRIVACY

	in	cm
A	72-76	182.9-193.0
B	36-38	91.4-96.5
C	30	76.2
D	24	61.0
E	12-14	30.5-35.6
F	108	274.3
G	54	137.2
H	24	61.0

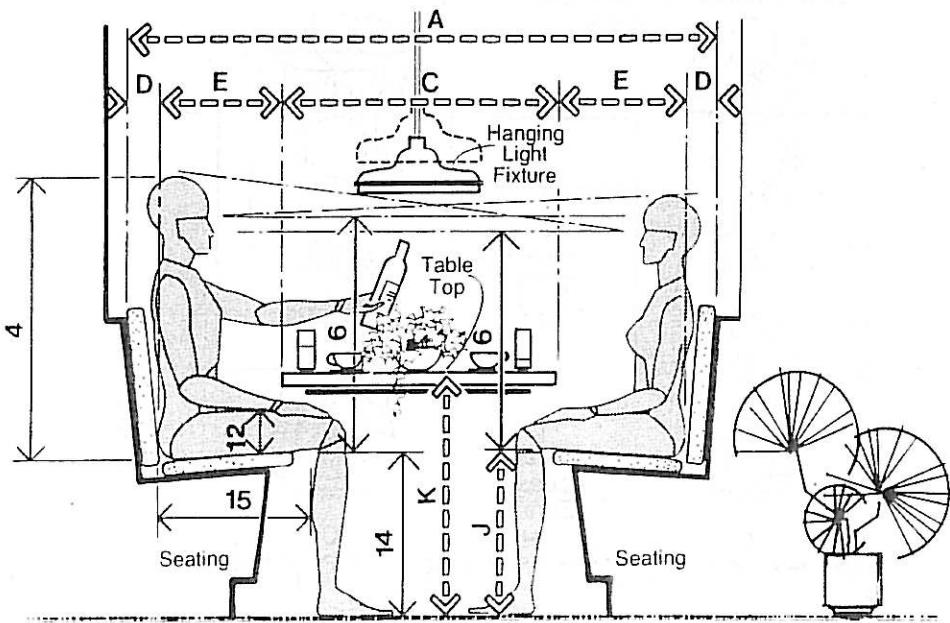
5.3 DINING SPACES

Booths, particularly in situations where both the seating and the table are fixed, provide no margin for individual adjustment. This lack of flexibility makes it essential that the anthropometric aspects of the design be considered closely. The height of the compressed seat should reflect popliteal height data; the depth of the seat, buttock-popliteal length data; the distance from the top of the seat to the underside of the table, thigh clearance data; the height of the booth or that of a hanging light fixture above the table top, eye-height sitting data; and the width of the seat, maximum body breadth data.

Equally important is the relation of human dimensions to the aisle for clearance of public and service circulation. The two drawings illustrate in both plan and section some of the basic anthropometric considerations involved.



BOOTH SEATING AND CIRCULATION CLEARANCES



BOOTH SEATING

	in	cm
A	65-80	165.1-203.2
B	17.5-20	44.5-50.8
C	30-40	76.2-101.6
D	2-4	5.1-10.2
E	15.5-16	39.4-40.6
F	30	76.2
G	36	91.4
H	18	45.7
I	48-54	121.9-137.2
J	16-17	40.6-43.2
K	29-30	73.7-76.2