



Lecture No. 2

Openings(Doors & Windows)

Course Director: Dr. Ahmed Elastal

Arch. Fahed Baker

Arch.Nidal abu Mos

Instructor:

Monday. 21-09-2020 (11-12 am)



الفتحات

Openings



Windows

Windows are a very important of both interior planning and exterior styling.

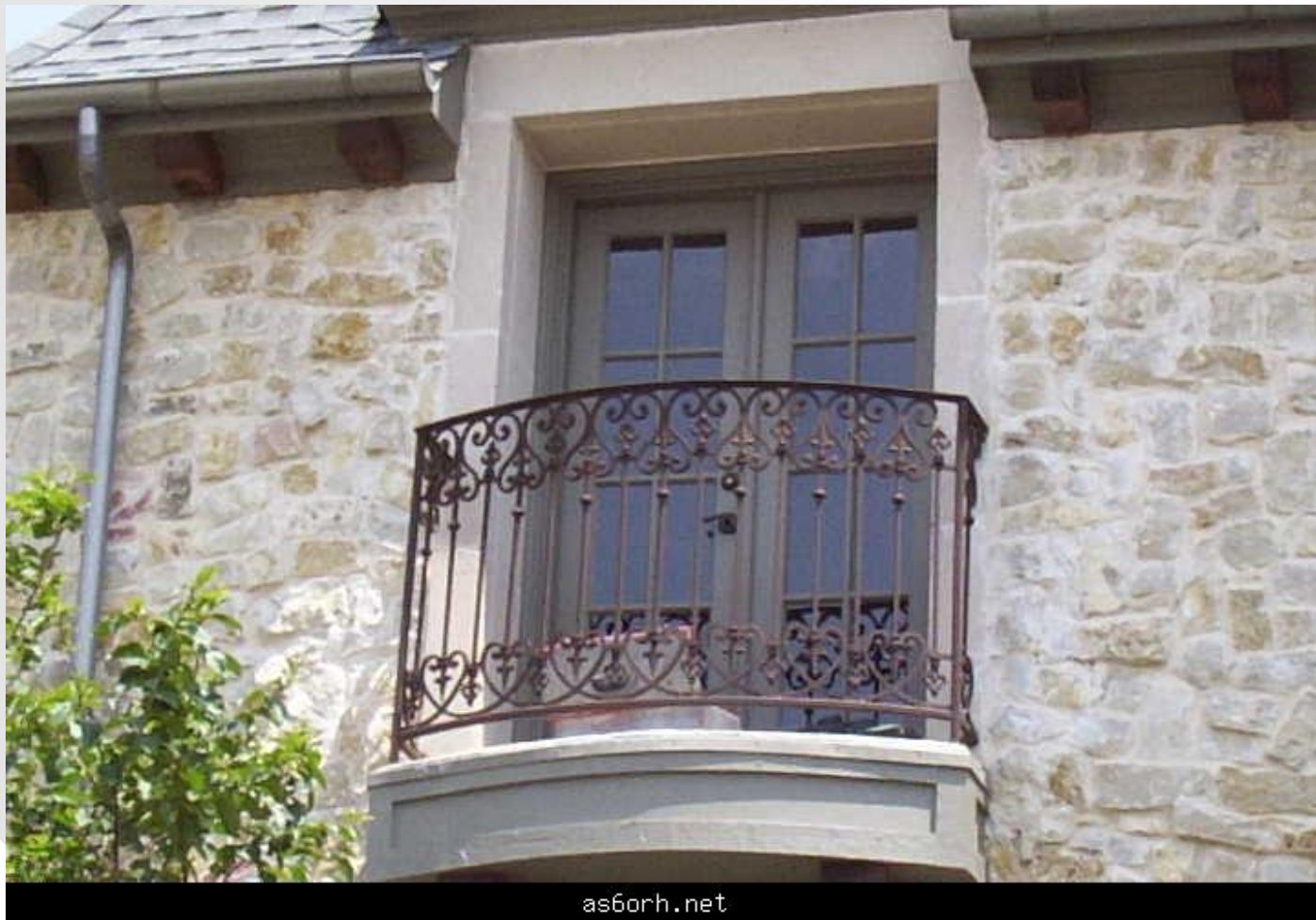


Windows





Windows





Windows

- ❖ **Traditionally, the window was considered an “opening” in the wall.**
- ❖ **Windows, perform several distinct functions. The most important of these is normally the admission of “light” both from a practical stand pointed for it’s psychological and aesthetic effect on the interior space.**



Windows





Windows

- ❖ Any window design must satisfy the technical requirements of the relevant parts of building. The main considerations are size, format, divisions, way of opening, thermal and sound insulation, fire resistance and general safety issues, including the use of security glazing must also be taken into account.



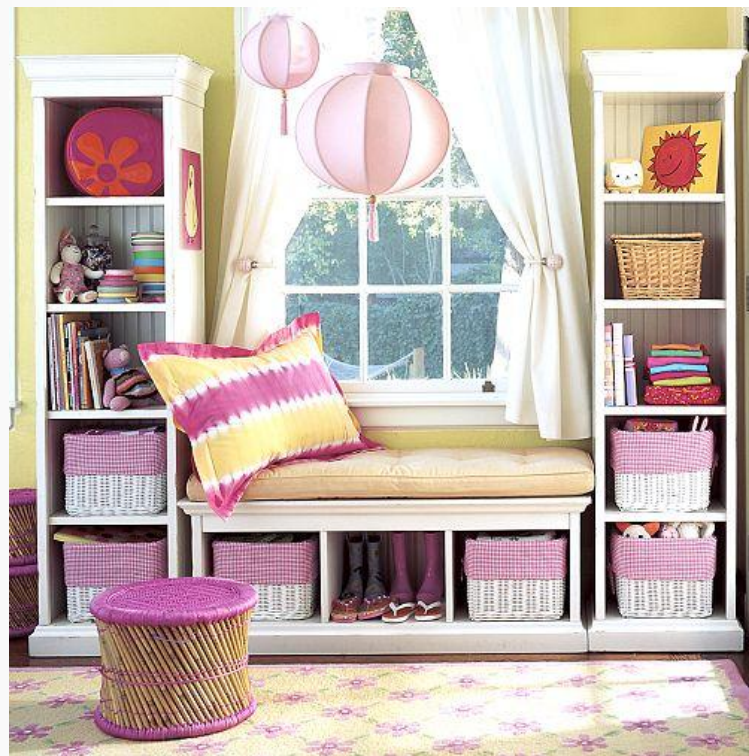
Windows

- ❖ A first function of windows is to transmit light into the house.
- ❖ A second function of windows is ventilation.
- ❖ A third function of windows is to permit vision, in or out.
- ❖ Fourth, windows sometimes serve as an emergency escape.
- ❖ Finally, windows are elements of architectural composition.





الروشان الرئيسي





Light

- ❖ **The amount of light admitted depends on the number, size, location, and transparency of the windows.**
- ❖ **The orientation of the windows will have an important effect upon the quality of the light admitted.**
- ❖ **The use of natural light greatly helps in making a room pleasant.**



Light





Light





Light

- ❖ The type of glass used will also affect the quality of the light, as well as the quantity.
- ❖ If daylight is considered to be essential for the use to which a room will be put, then windows are an unavoidable necessity.



Light

- ❖ **The minimum acceptable glass area in residential work is 10% of floor area.**
- ❖ **For workrooms which are 3.5m or more high, the light transmission surface of the window must be at least 30% of the outside wall surface, i.e $>0.3 AXB$.**



المشريات





المشربيات





المشريات





Light



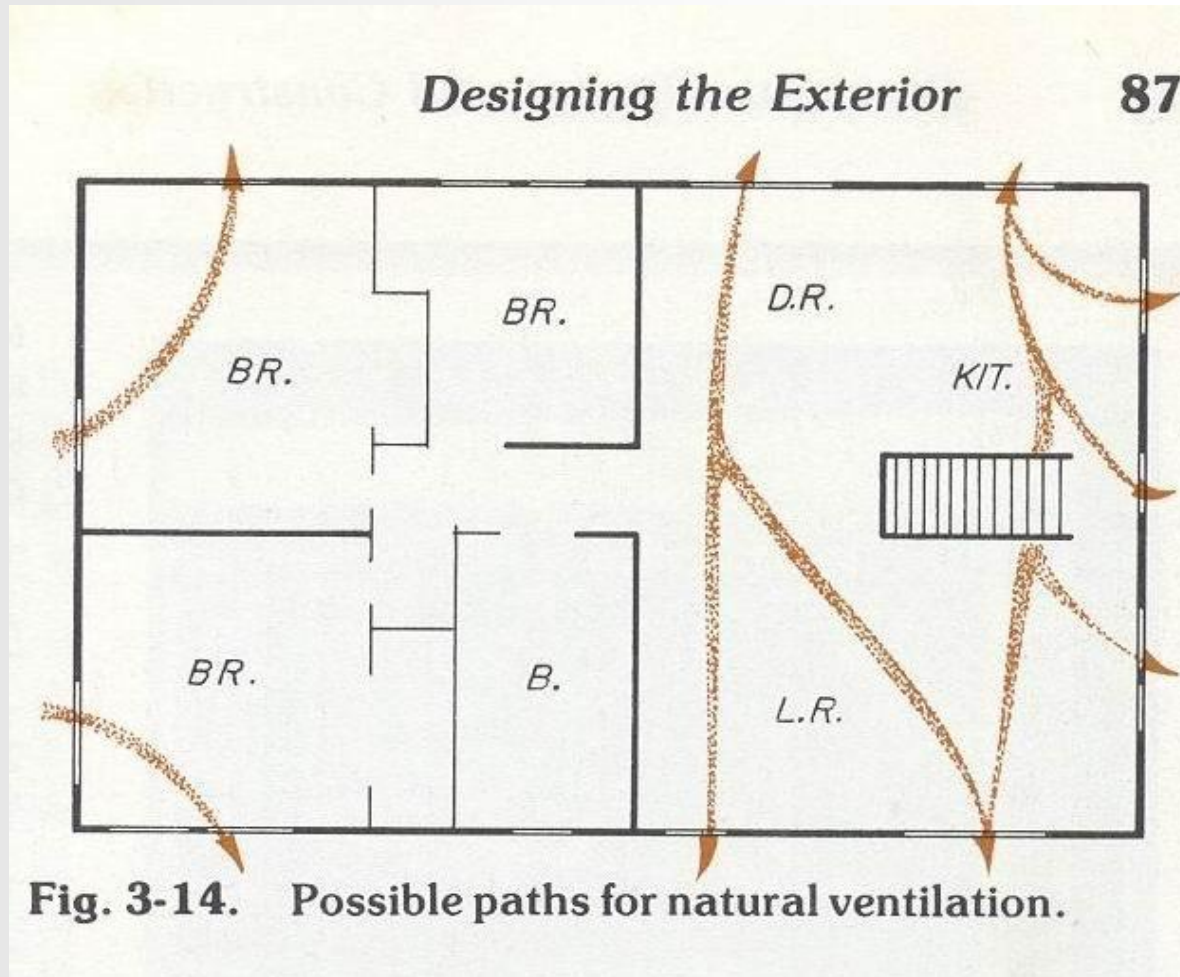


Ventilation

- ❖ Where windows are used for ventilation, the requirements vary the season and the climate.
- ❖ In cold weather the principal requirement is to deflect the entering air upward.
- ❖ In hot dry summer weather, it is often desirable to admit as much breeze as possible.



Ventilation





Vision

- ❖ The vision function of glass in windows works both ways, permitting one to look out as well as to look in.
- ❖ Where looking out is a pleasure that can be indulged, large clear glass areas should be used with as few divisions as possible.

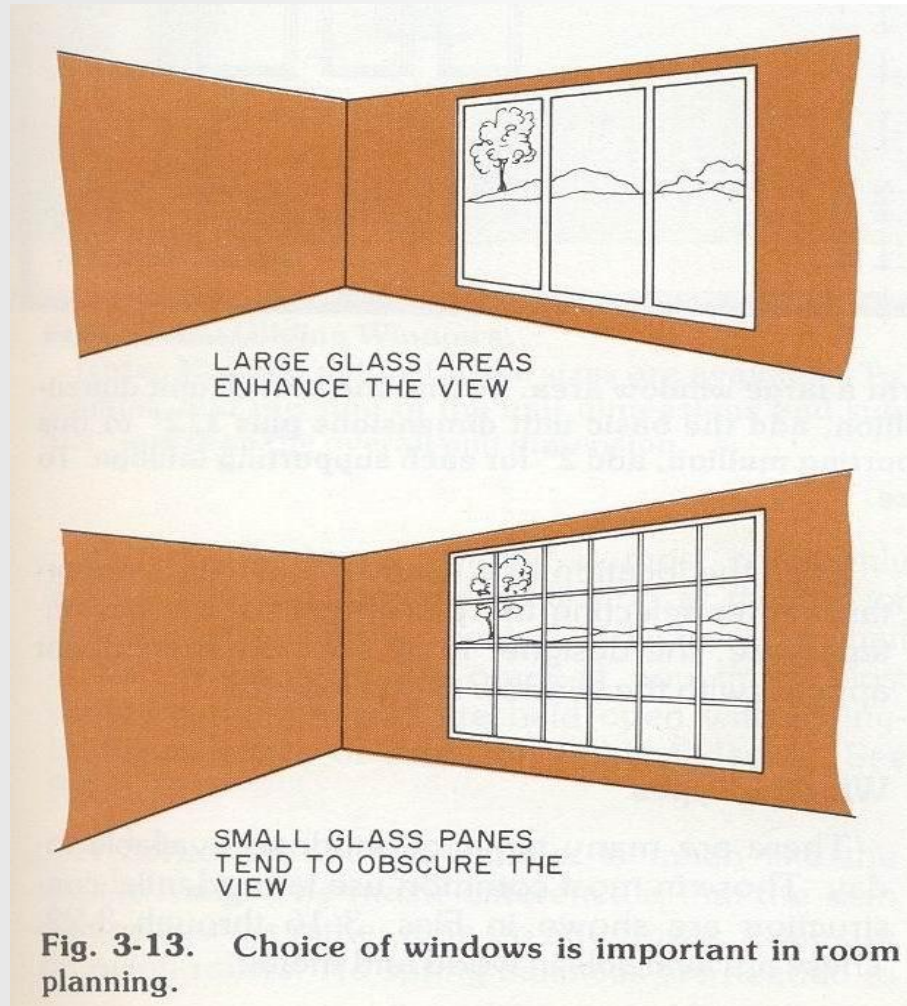


Vision

- ❖ **A pleasant view can be enjoyed or blocked depending upon window selection. If a room has a pleasant view, the window sill should be low enough to enable a seated person to look out without straining.**



Vision





الفتحات المعمارية









Vision

The use of large glass areas not only permits the view to be enjoyed but also makes the room itself seen more spacious.



vision





Escape

- ❖ Windows used for emergency escape must be easy to open, have reasonably low sills, and openings large enough to go through without difficulty.



Materials

Windows are commonly made of wood, steel, and aluminum, less often of stainless steel or bronze.









Types of Windows

- ❖ **Single-hung**
- ❖ **Double-hung (Casement)**
- ❖ **Projected**
- ❖ **Awning**
- ❖ **Pivoted**
- ❖ **Sliding Window**
- ❖ **Pictured Window**

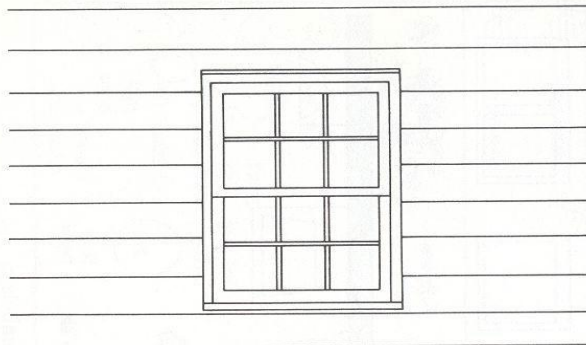


Types of Operation

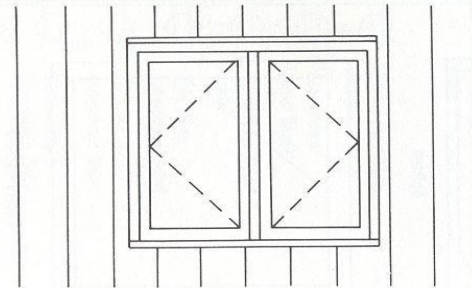
- ❖ **Window vents may slide horizontally or vertically.**
- ❖ **Hinged at top open out (casement)**
- ❖ **Hinged at bottom open in (casement)**
- ❖ **Hinged at left.**
- ❖ **Hinged at right (casement side hung)**
- ❖ **Pivoted-vertically or horizontally.**
- ❖ **Fixed light.**



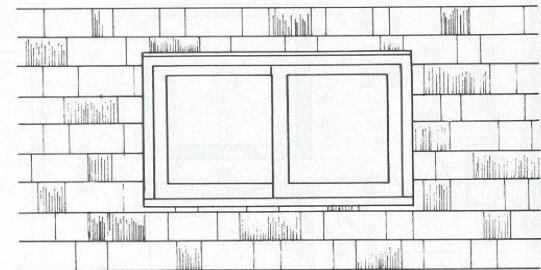
Types of Operation



Elevation of double hung window in frame wall.

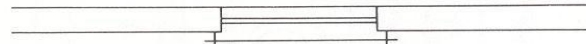


Elevation of double casement window in frame wall.

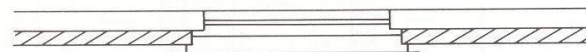


Elevation of sliding window in frame wall.

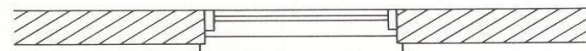
HORIZONTAL WOOD SIDING



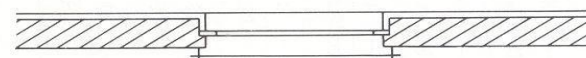
Plan view of double hung window in frame wall.



Plan view of double hung window in brick veneer wall.

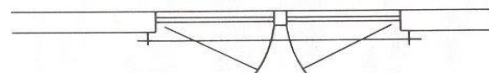


Plan view of double hung window in solid brick wall.

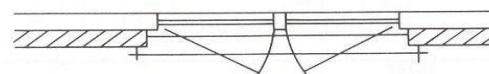


Plan view of double hung metal window with plastered returns.

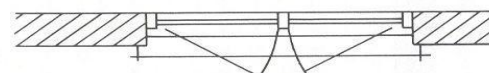
VERTICAL WOOD SIDING



Plan view of double casement window in frame wall.

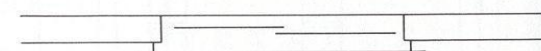


Plan view of double casement window in brick veneer wall.

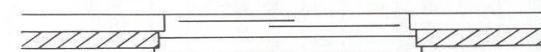


Plan view of double casement window in solid brick wall.

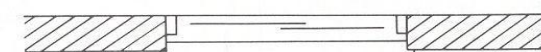
WOOD SHINGLE SIDING



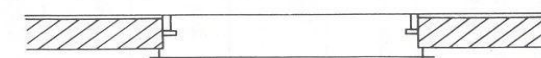
Plan view of sliding window in frame wall.



Plan view of sliding window in brick veneer wall.



Plan view of sliding window in solid masonry wall.

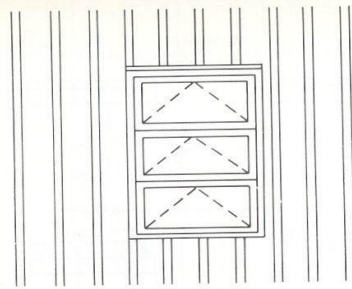


Plan view of metal sliding window with plastered returns.

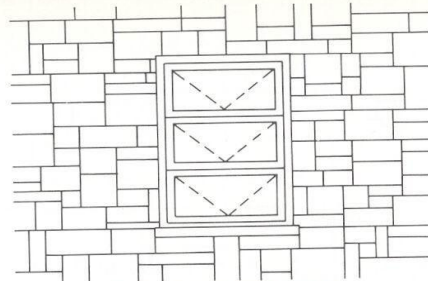
Fig. 6-1. (cont.) Window and wall section symbols.



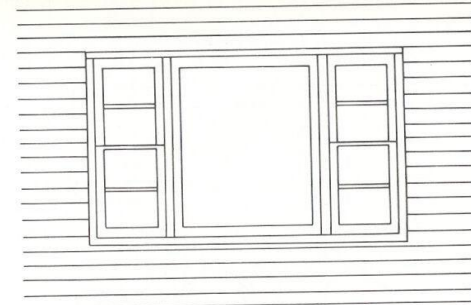
Types of Operation



Elevation of awning window in frame wall.

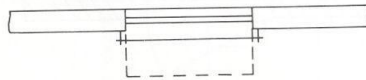


Elevation of hopper window in masonry wall.

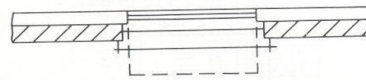


Elevation of fixed picture window with double hung side lights in brick wall.

BOARD AND BATTEN SIDING



Plan view of awning window in frame wall.

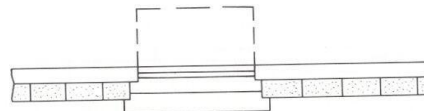


Plan view of awning window in brick veneer wall.

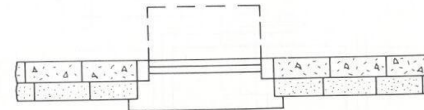


Plan view of awning window in solid masonry wall.

CUT STONE SIDING



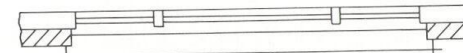
Plan view of hopper window in cut stone veneer wall.



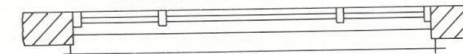
Plan view of hopper window wall 4" concrete block with cut stone veneer. Often backed with one course of brick.



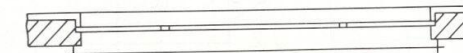
Plan view of fixed picture window with double hung side lights in frame wall.



Plan view of fixed picture window with double hung side lights in brick veneer wall.



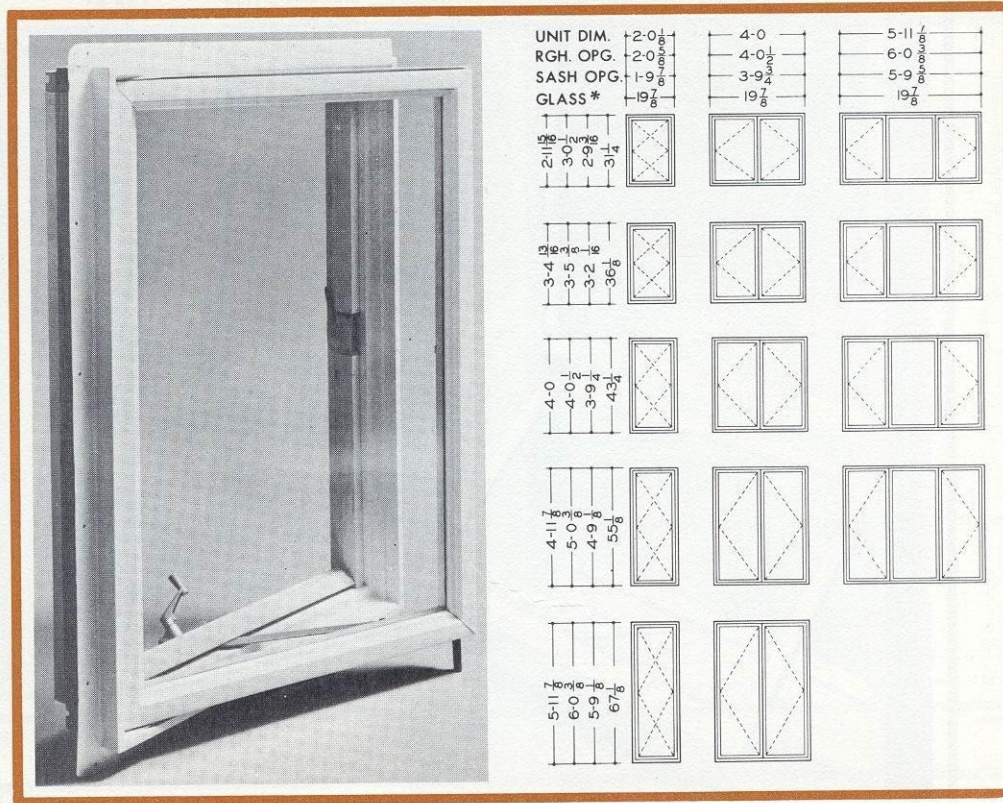
Plan view of fixed picture window with double hung side lights in solid masonry wall.



Plan view of metal fixed picture window with side lights and plastered returns.

Fig. 6-1. (cont.) Window and wall section symbols.

Casement Window



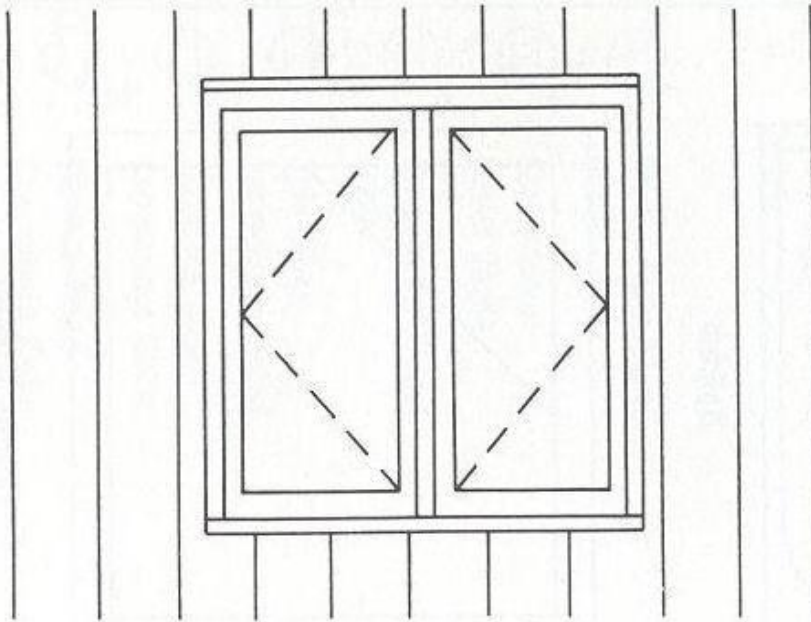
Andersen Corporation

Fig. 3-22. Casement window.

Note: Multiple units of these sizes are available. To find the overall unit dimension for a combination unit, add the unit dimensions together plus 1/8" for each unit joining. To find the rough opening, add 1/2" to the overall unit dimension. Example: If 2 unit C23 windows are joined to form a 4-window opening, the unit dimension is $4'-0" + 4'-0" + 1/8" = 8'-0 1/8" + 1/2"$ or $8'-0 5/8"$.

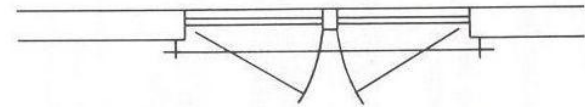


Casement Window

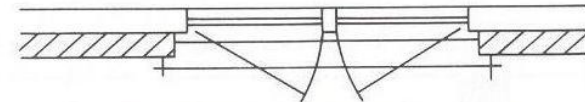


Elevation of double casement window in frame wall.

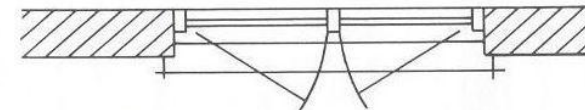
VERTICAL WOOD SIDING



Plan view of double casement window in frame wall.



Plan view of double casement window in brick veneer wall.



Plan view of double casement window in solid brick wall.



Casement Window

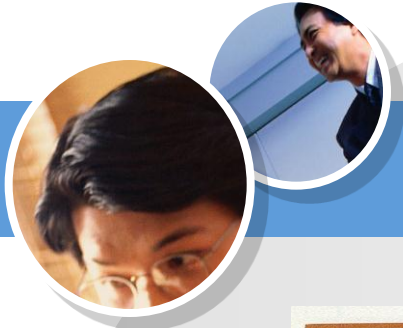


Casemaster & French Casemaster Windows

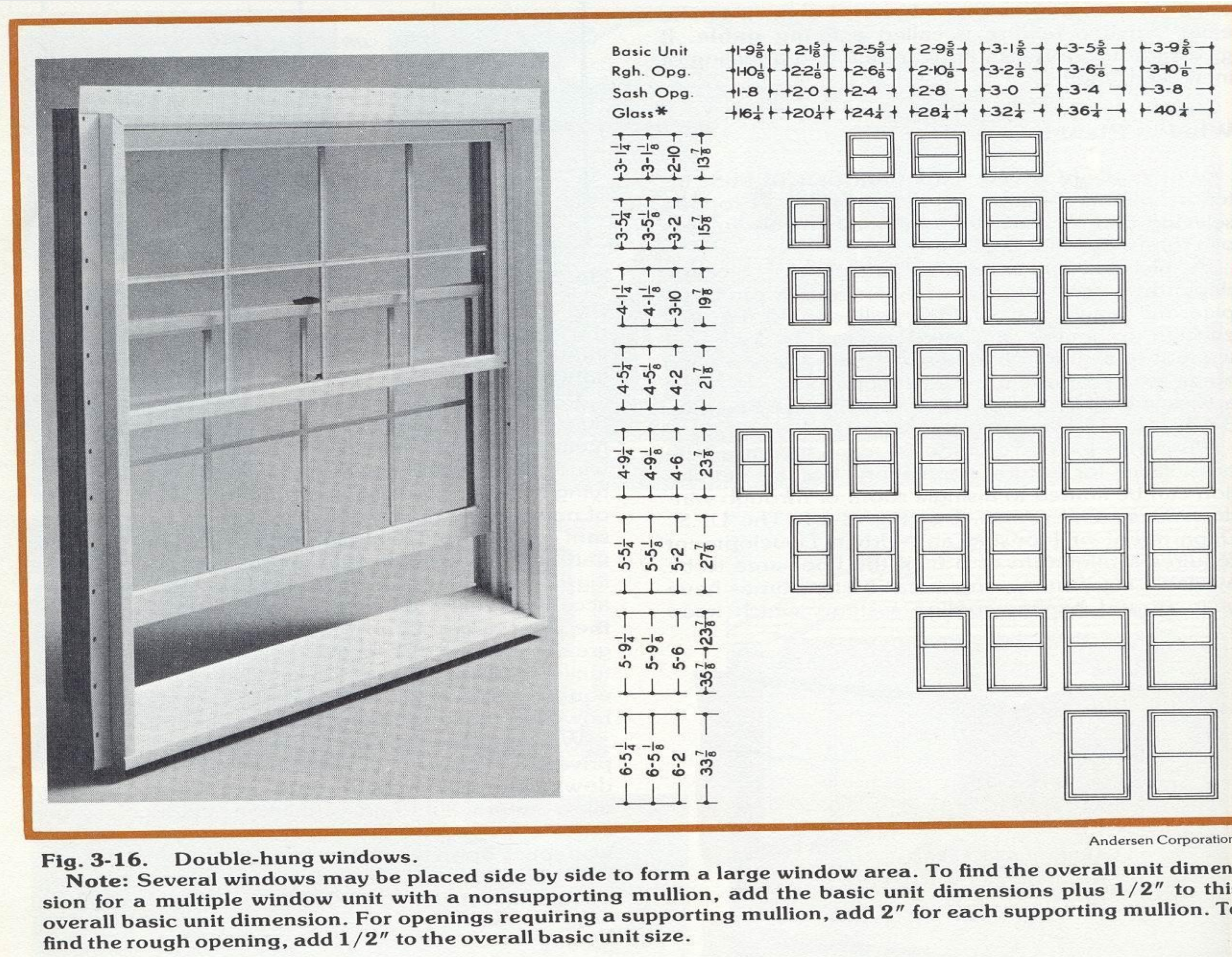


Casement Window



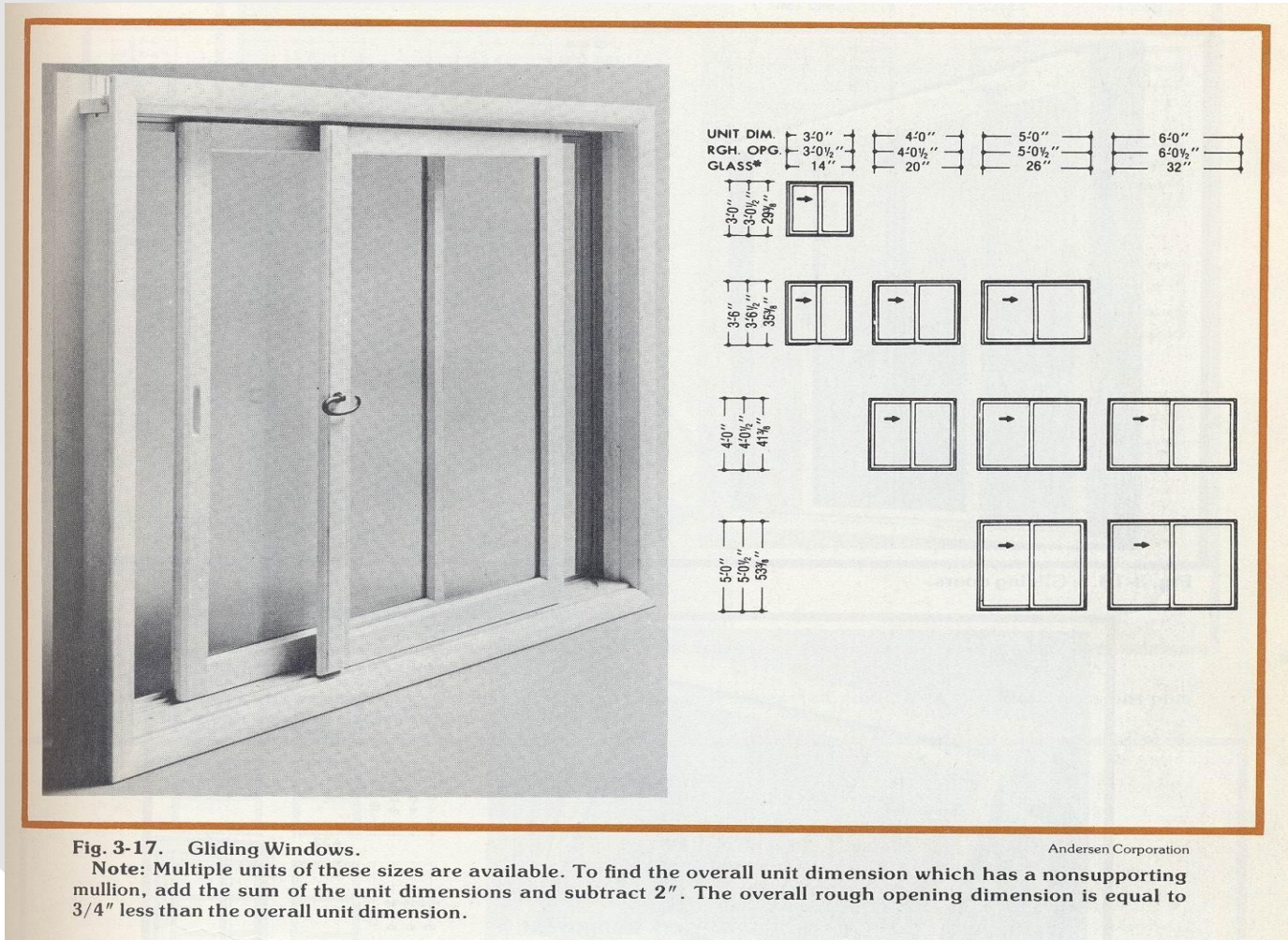


V. Sliding Window



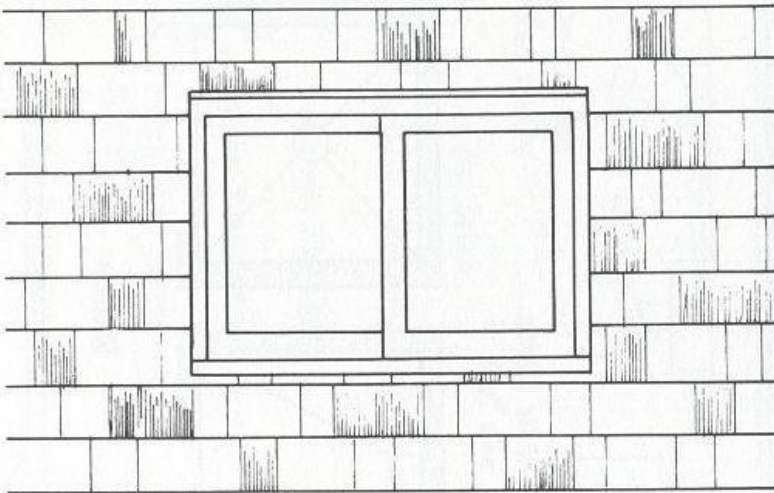


H. Sliding window

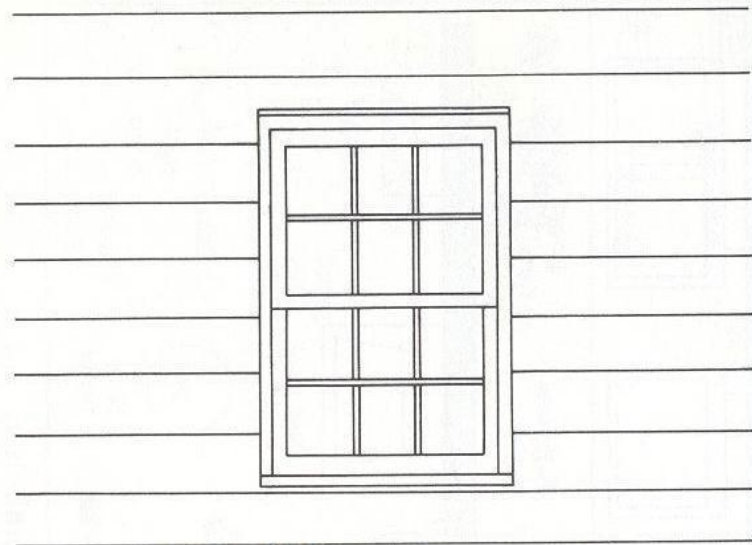




Types of Operation



Elevation of sliding window in frame wall.



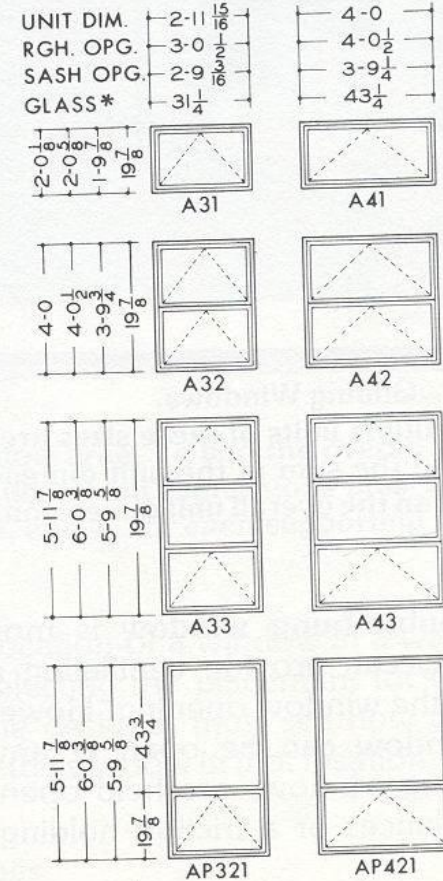
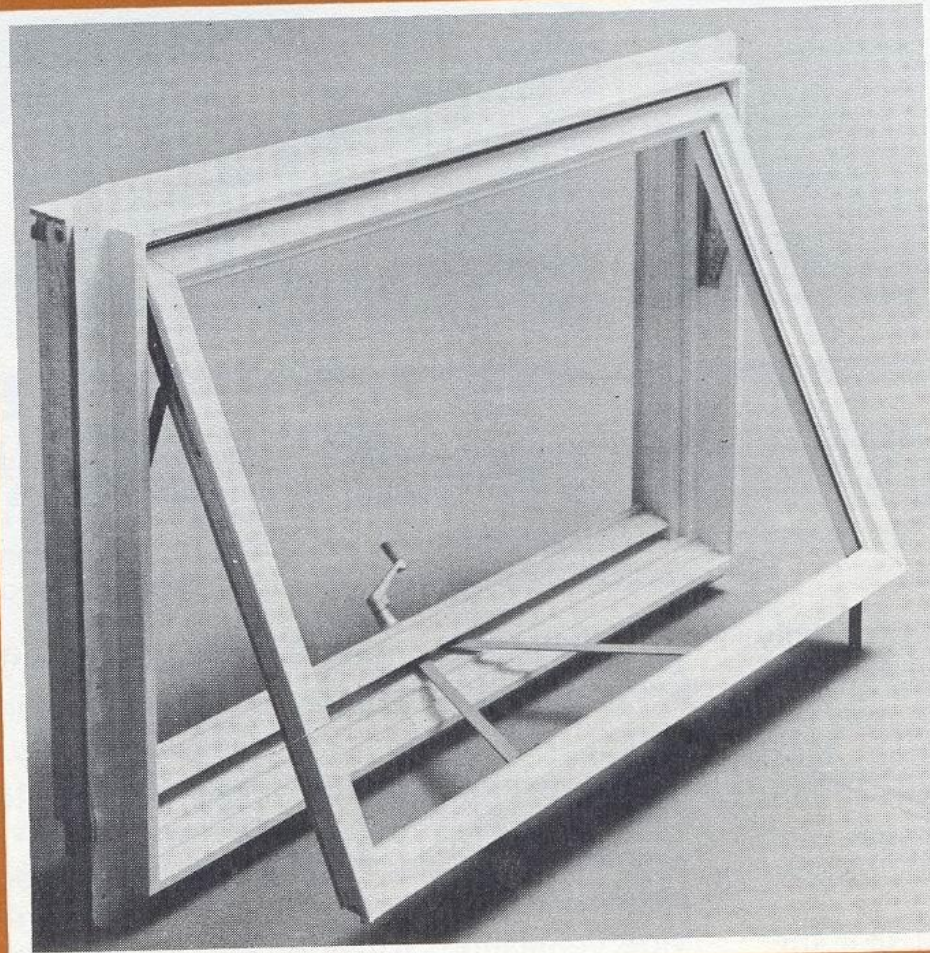
Elevation of double hung window in frame wall.



Types of Operation



Types of Operation



*Unobstructed Glass Sizes Shown

Andersen Corporation

Fig. 3-19. Awning unit.

Note: Multiple units of these sizes are available. See the casement unit illustration for explanation.



Types of Operation





Fixed sash with awning sash

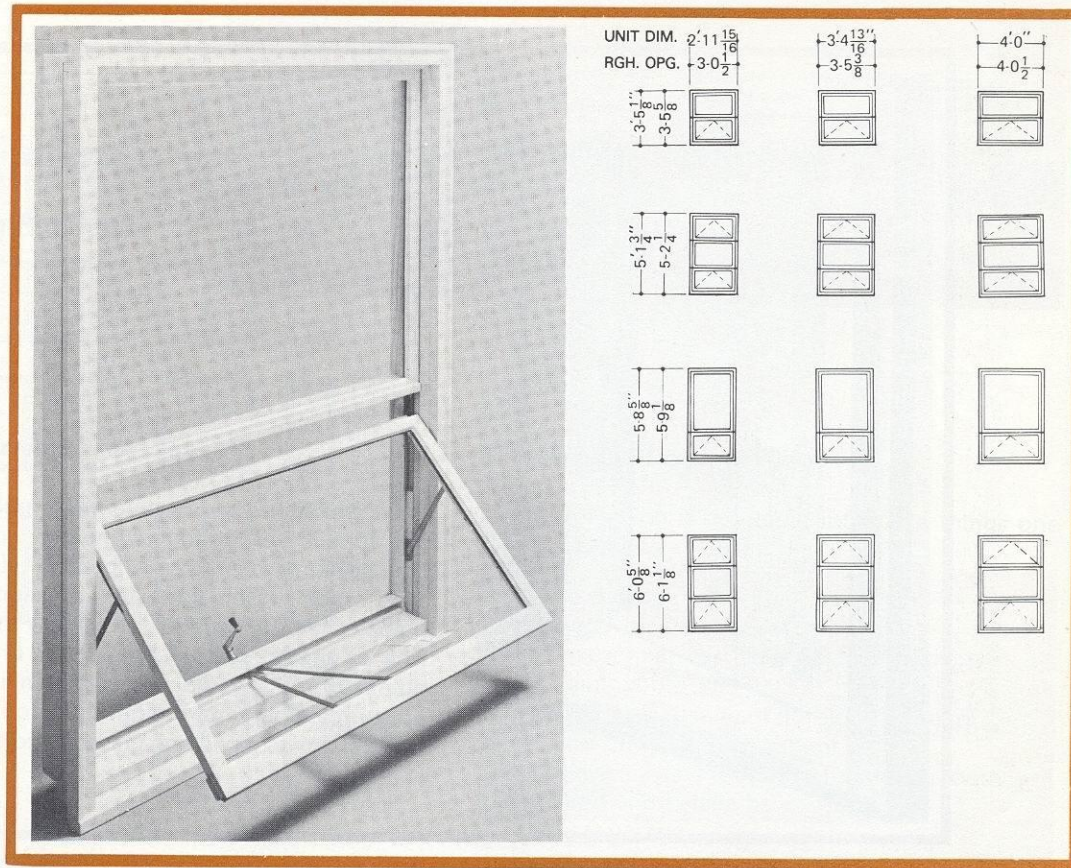


Fig. 3-20. Fixed sash with awning sash.

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Note: Multiple units are available. To find the overall basic unit dimension, add the basic unit dimensions plus 2-7/8". The rough opening size is the sum of the basic units plus 1/2".

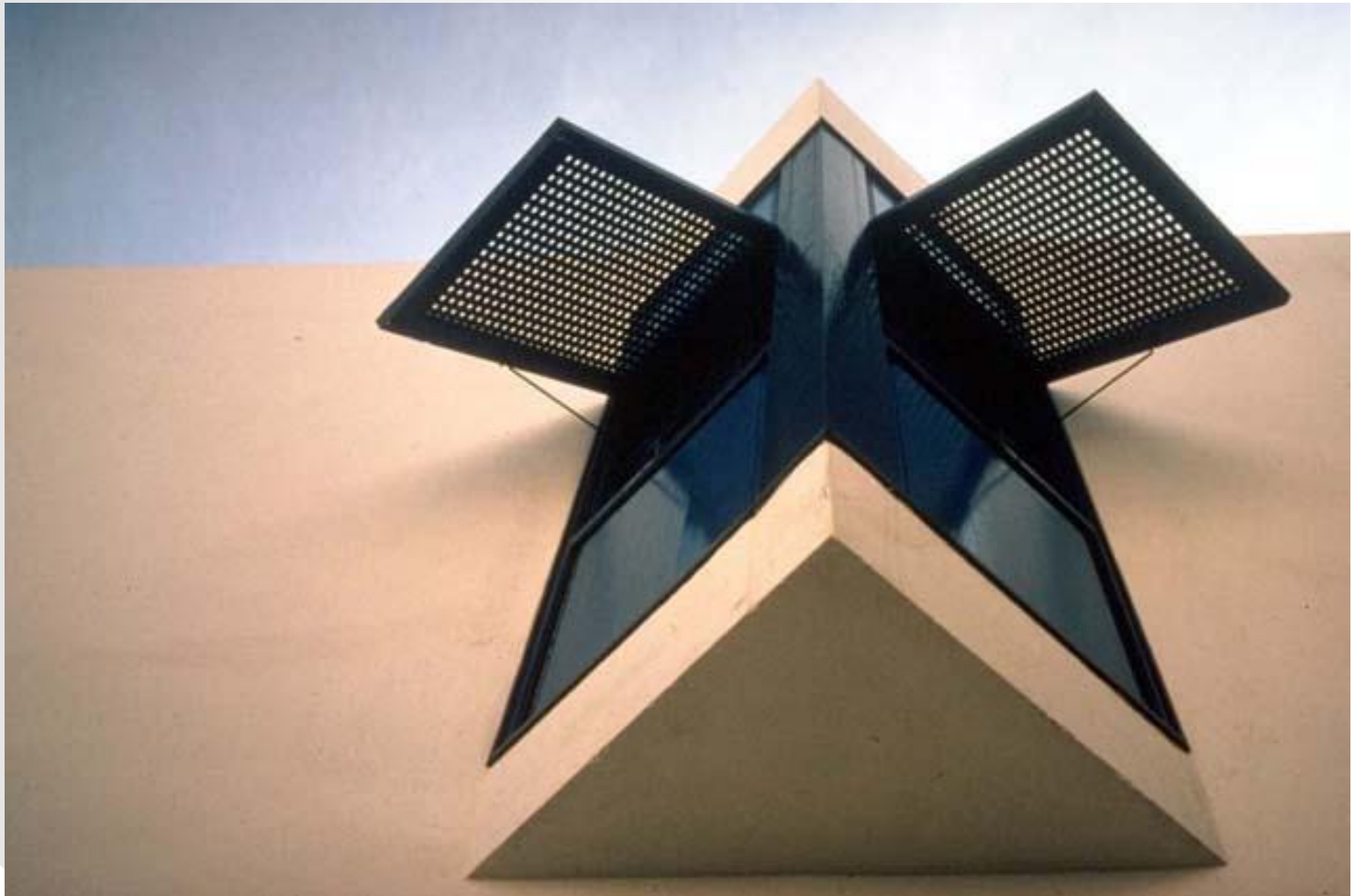


Fixed sash with awning sash





Types of Operation



Types of Operation

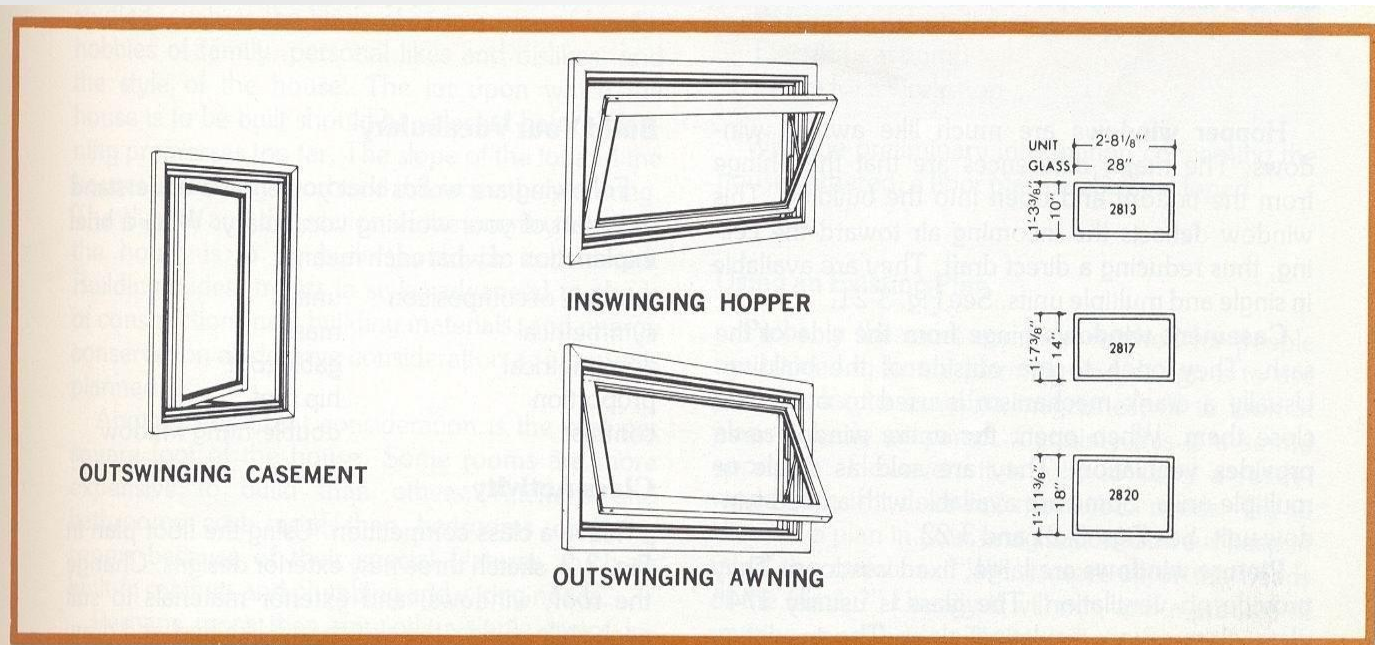


Fig. 3-21. Outswinging awning, inswinging hopper, and outswinging casement windows.

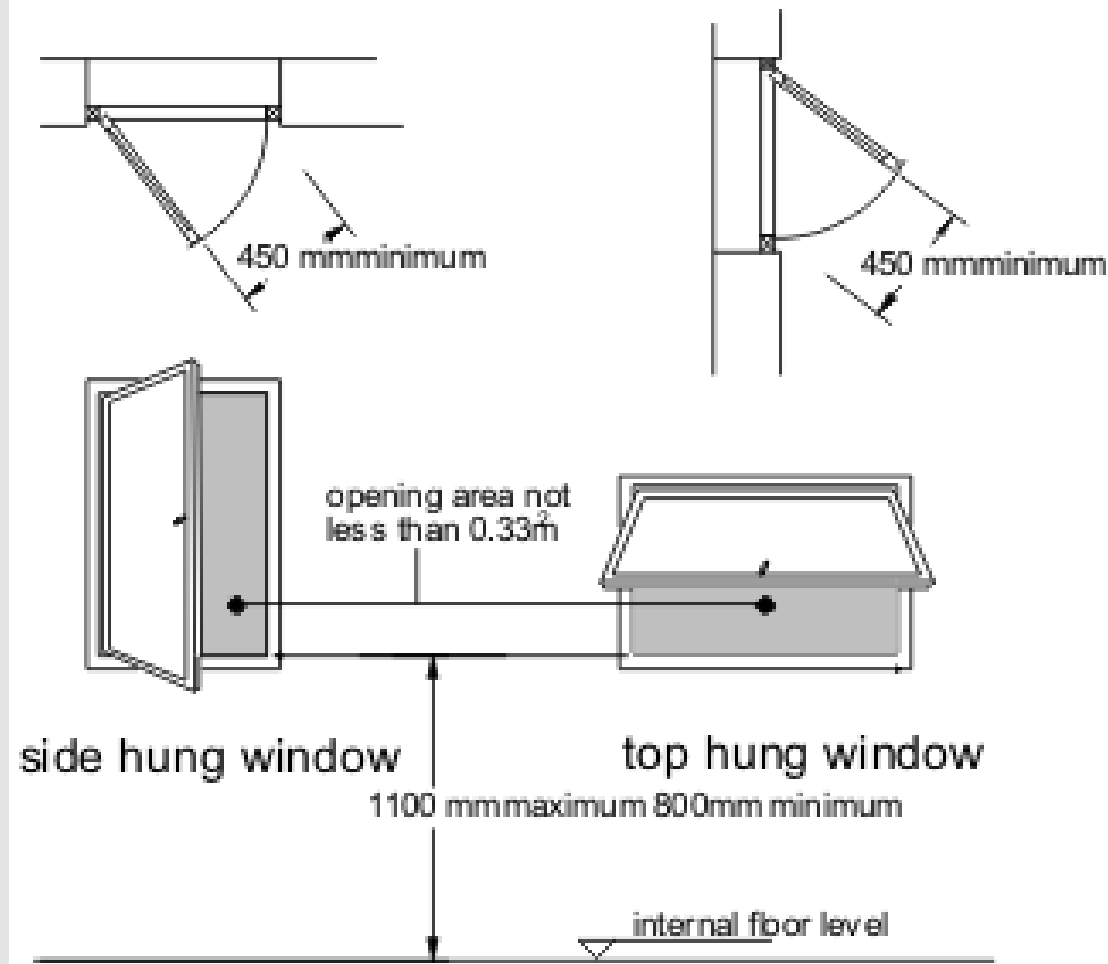
Andersen Corporation

Note: To find the overall basic unit width of multiple units, add the basic unit dimensions plus 2-7/8" to the total. To find the rough opening width, add the basic unit width plus 1/2".

These units can be stacked vertically. The overall unit dimension for stacked units is the sum of the basic units plus 3/4" for two units high, less 1/4" for three units high, and less 1-1/4" for four units high.



Types of Operation

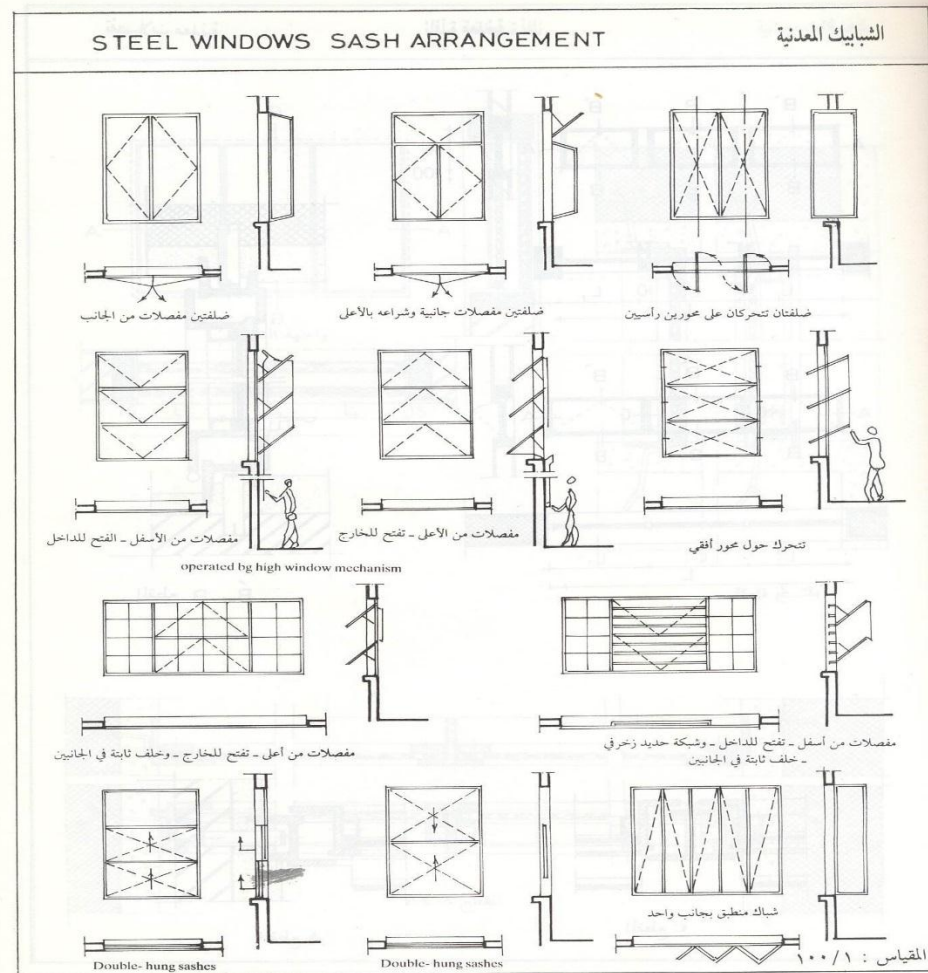




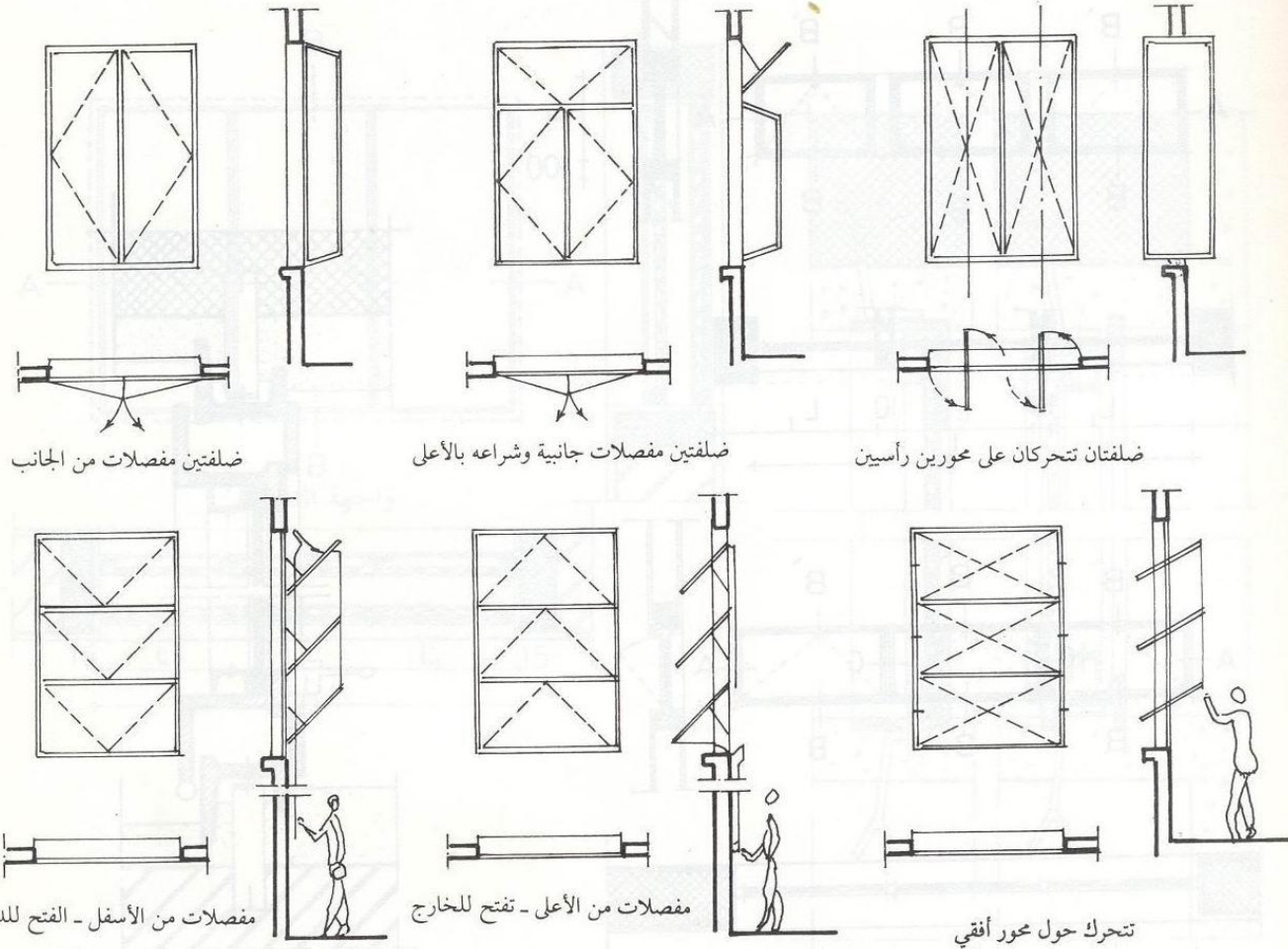
Types of Operation



Types of Operation



Types of Operation

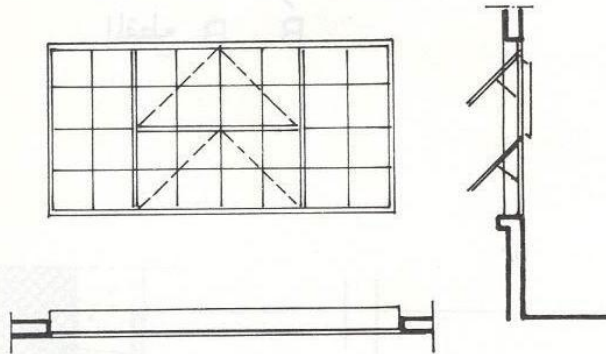


operated by high window mechanism

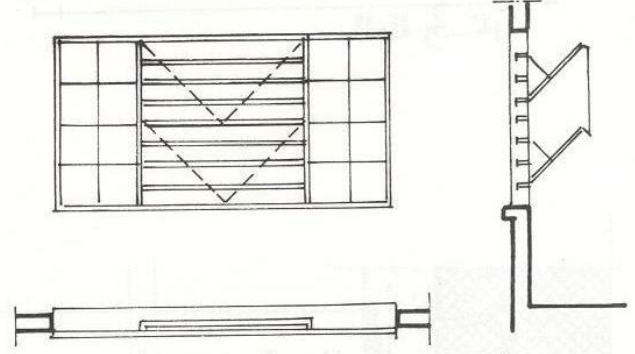


Types of Operation

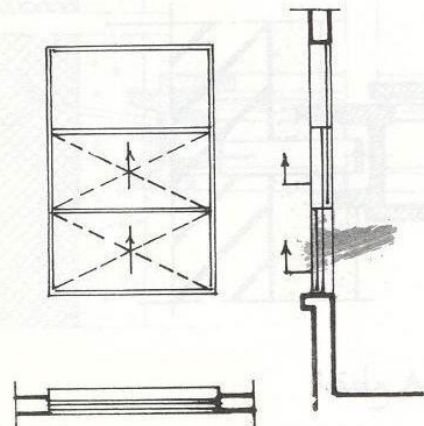
operated by high window mechanism



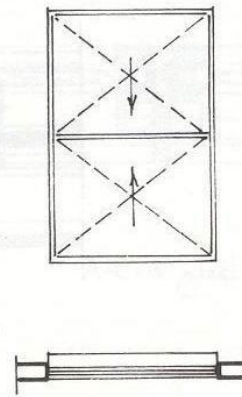
مفصلات من أعلى - تفتح للخارج - وخلف ثابتة في الجانبين



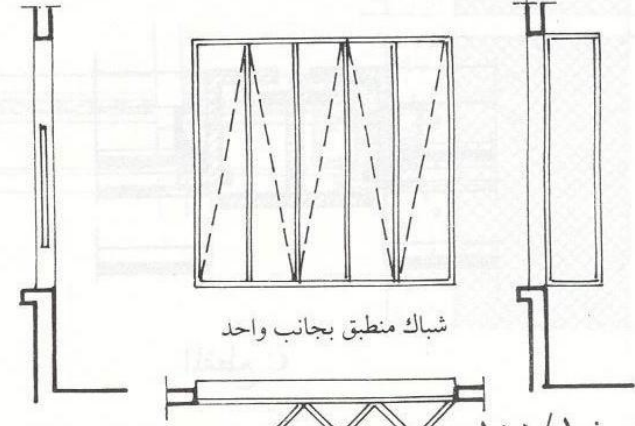
مفصلات من أسفل - تفتح للداخل - وشبكة حديد زخرفي - خلف ثابتة في الجانبين



Double- hung sashes



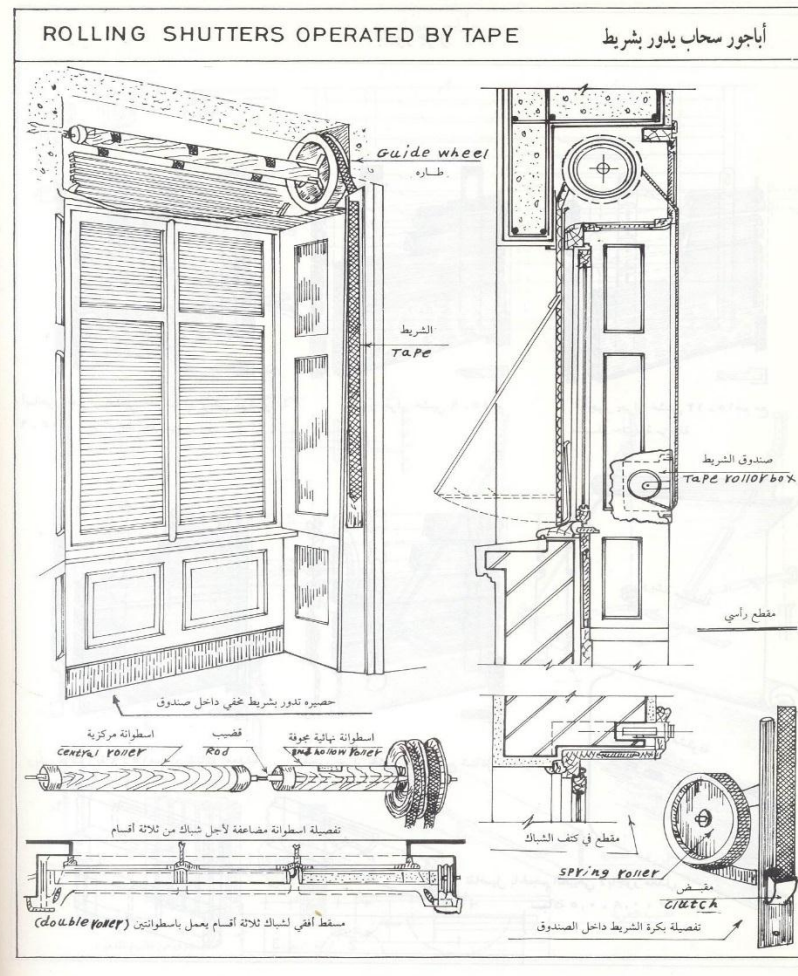
Double- hung sashes



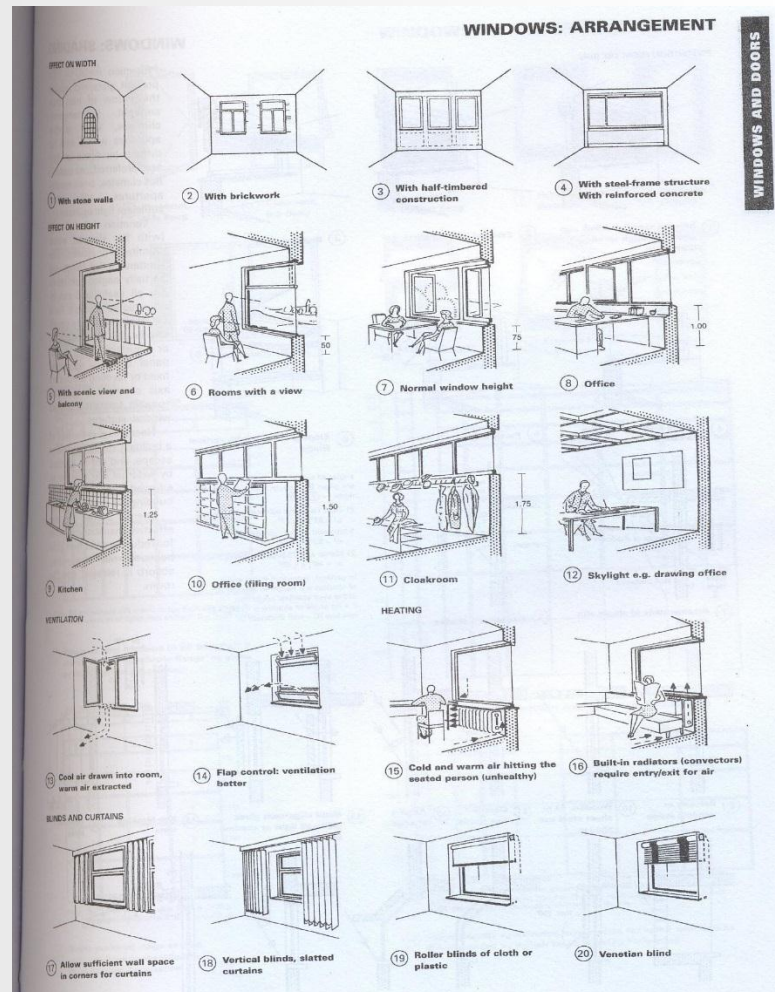
شباك منطبق بجانب واحد

المقياس : ١٠٠/١

Types of Operation

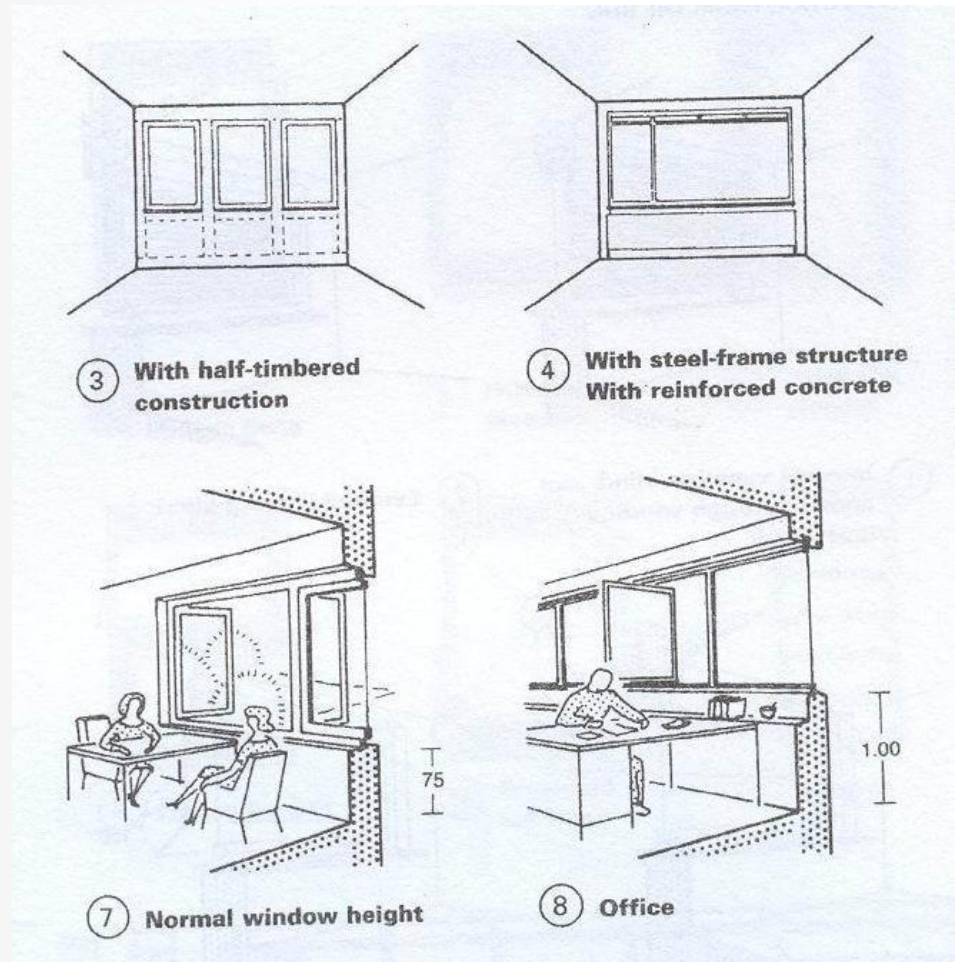
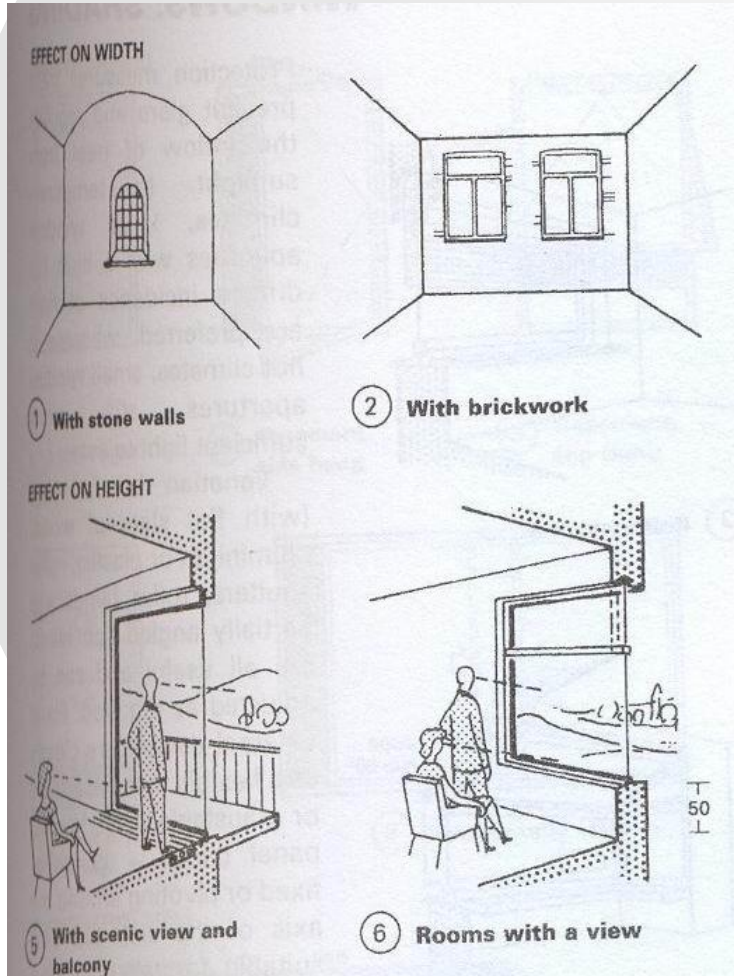


Types of Operation



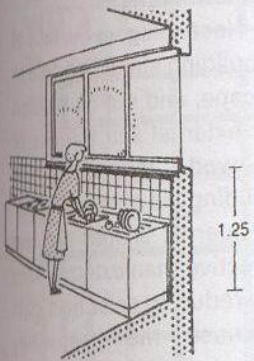


Types of Operation

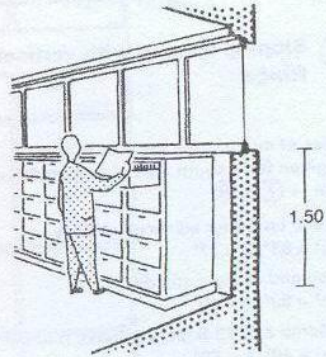




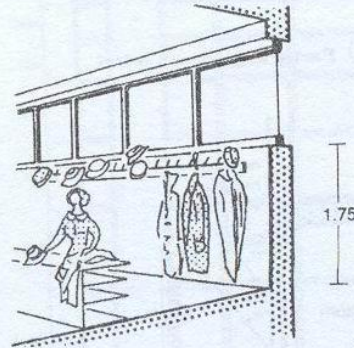
Types of Operation



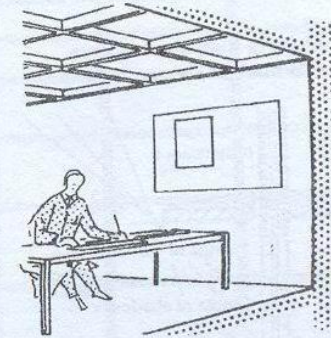
⑨ Kitchen



⑩ Office (filing room)

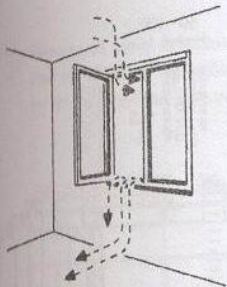


⑪ Cloakroom

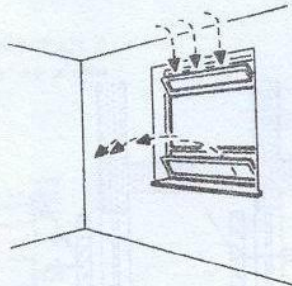


⑫ Skylight e.g. drawing office

VENTILATION

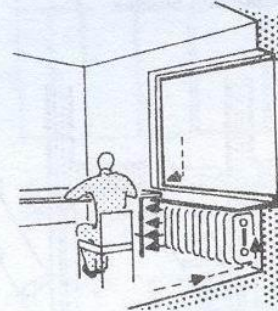


⑬ Cool air drawn into room, warm air extracted

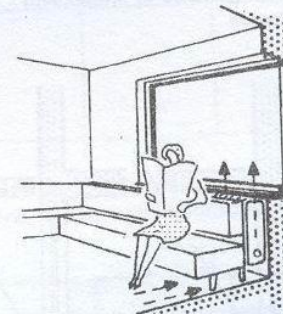


⑭ Flap control: ventilation better

HEATING



⑮ Cold and warm air hitting the seated person (unhealthy)

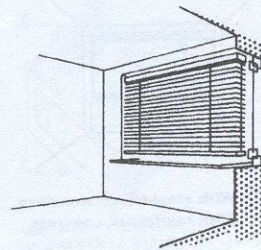


⑯ Built-in radiators (convectors) require entry/exit for air

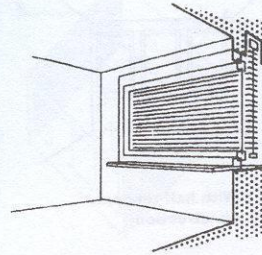
Types of Operation

WINDOWS AND DOORS

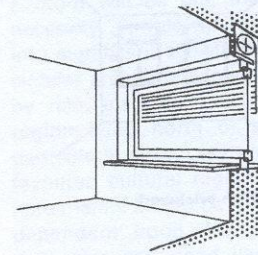
PROTECTION FROM THE SUN



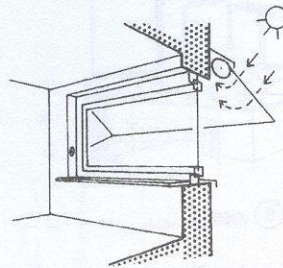
① Internal venetian blind: sun comes through window (not good)



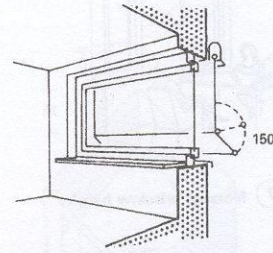
② External louvred blind



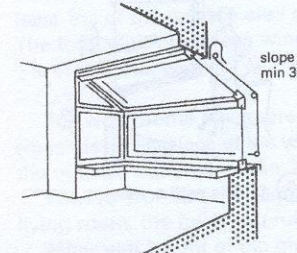
③ Roller shutter



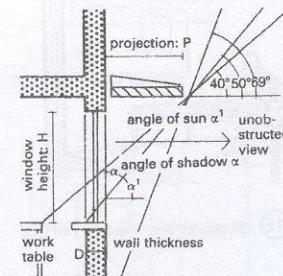
④ Awning keeps sun's rays and heat at bay



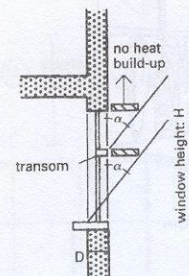
⑤ Partly angled sun blind



⑥ Sloping awning with vertical fringe



⑦ Arrangement of single sun shades



⑧ Double sun shades

angles of sun α^1 and angle of shadow α are given for a south wall at latitude 50° north $\rightarrow$ ⑦-⑧

21 June (summer solstice), midday
 $\alpha^1 = 63^\circ$; $\alpha = 27^\circ$

1 May and 31 July, midday
 $\alpha^1 = 50^\circ$; $\alpha = 40^\circ$

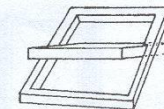
21 March and 23 Sept (equinox), midday
 $\alpha^1 = 40^\circ$; $\alpha = 50^\circ$

In general, projection $P = \text{tg angle of shadow } \alpha \times \text{height of window } H$; at the very smallest projection, $P = (\text{tg angle of shadow } \alpha \times \text{height of window } H) - \text{wall thickness } D$.

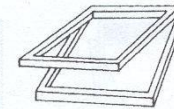


Types of Operation

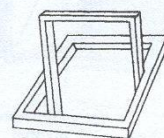
WINDOWS AND DOORS



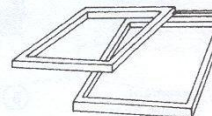
① Pivoting windows



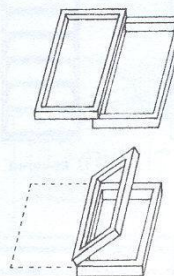
② Top-hung windows; sliding



③ Sliding windows; escape



④ Top-hung window with vertical unit → ⑫



⑤ Layout of roof windows



Other considerations

- ❖ The designer must always be aware of exterior design when selecting windows. The style of window must be in keeping with the style of house.
- ❖ Windows can be planned to achieve a sense of privacy.
- ❖ The location and size of windows has a great influence upon the furniture that can be used in a room.

تصميم الفتحات المعمارية

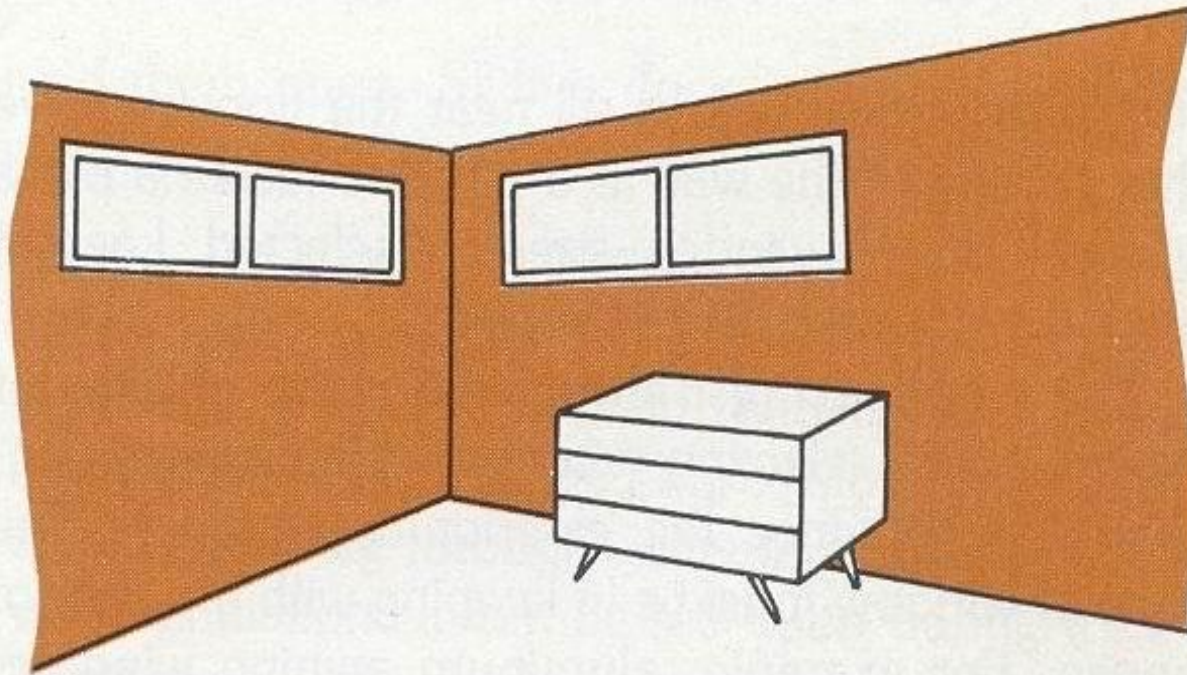


Fig. 3-15. High windows give privacy and allow wall space for furniture.

نماذج فتحات الشبابيك

Ra Workshop

File Edit View Project Materials Reports Tools Windows Help

OFR0001 - My First Project* OFR06581 - Demo PVC OFR06582 - Demo Al*

Project Explorer

- OFR0001 - My First Project
 - OFR06581 - Demo PVC
 - 01.F1
 - 02.Panou
 - 03.F+U
 - 04.F4
 - 05.F5
 - 06.F6

Properties

General Information

Code	OFR06582
Name	Demo Al
Description	
Currency	Euro

Project state

Type	Offer
Phase	Starting Offer
Closed project	No
Use optimization losses	No

Users

Created by	admin
Modified by	admin
Blocked by	

Project date

Project date	12/02/2009
Delivery date	29/11/2007
Created on	27/11/2007
Modified On	12/02/2009

Material information

Materials

Material	Aluminum
Profile System	PRD 2009.11
Profile System - Name	Aluminum Opening System
Color	1003
Glass - Code	CI-CI 4/16/4
Name	GT Clar-Clar 4-14-4
Fittings Plan	AL - Windows (Type II)

Statistics

Production Value	8,388.83
Discount	0.00
Component Value no VAT	11,433.83
Selling value	17,150.75
VAT	3,258.64
Total value	20,409.39

01 - F1

Image:

Code: 01
Name: F1
Quantity: 5

02 - Panou

Image:

Code: 02
Name: Panou
Quantity: 2

03 - F+U

Image:

Code: 03
Name: F+U
Quantity: 5

04 - F4

Image:

Code: 04
Name: F4
Quantity: 1

05 - F5

Image:

Code: 05
Name: F5
Quantity: 1

06 - F6

Image:

Code: 06
Name: F6
Quantity: 1

Summary Design Consumption Reports

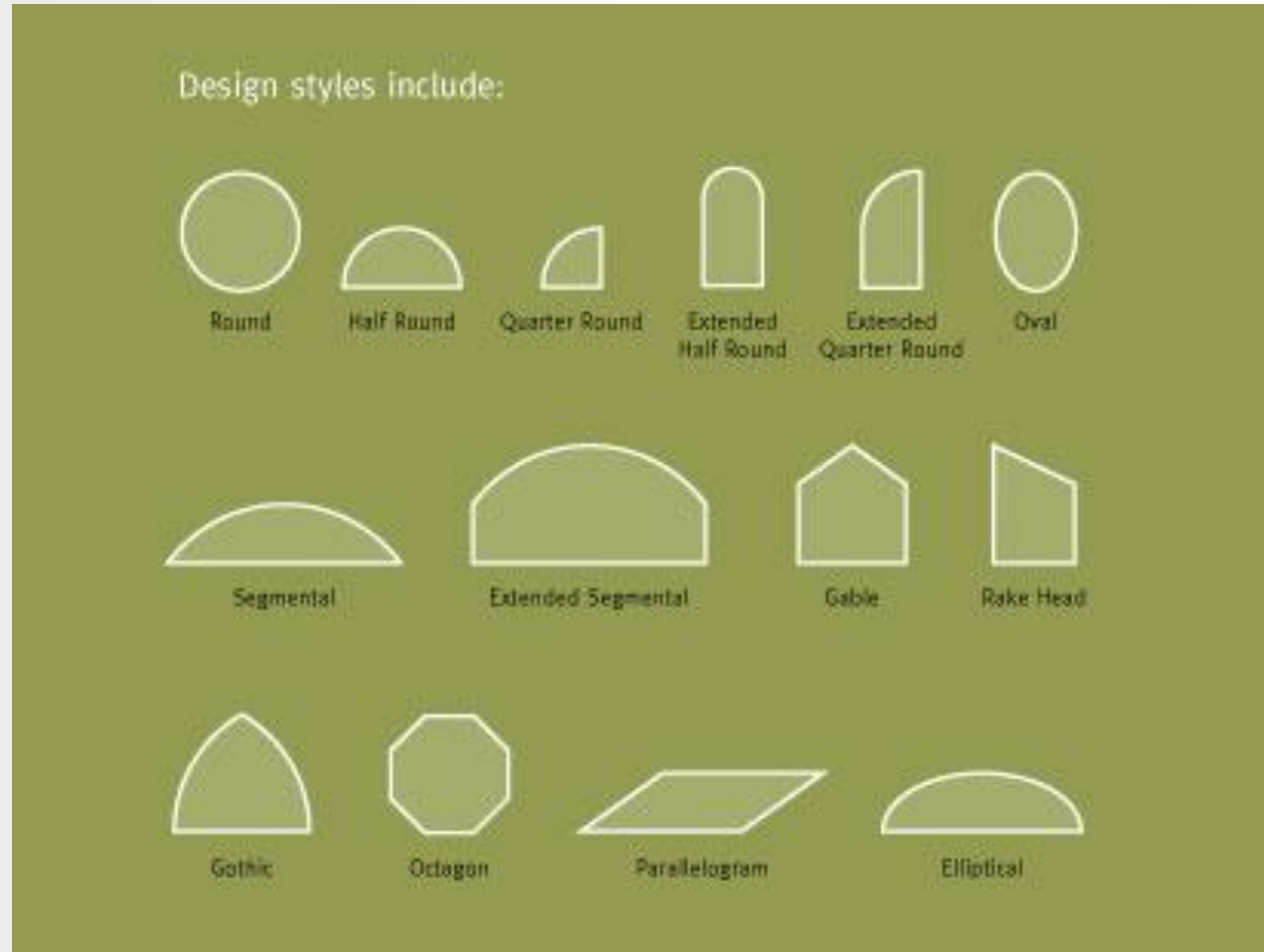
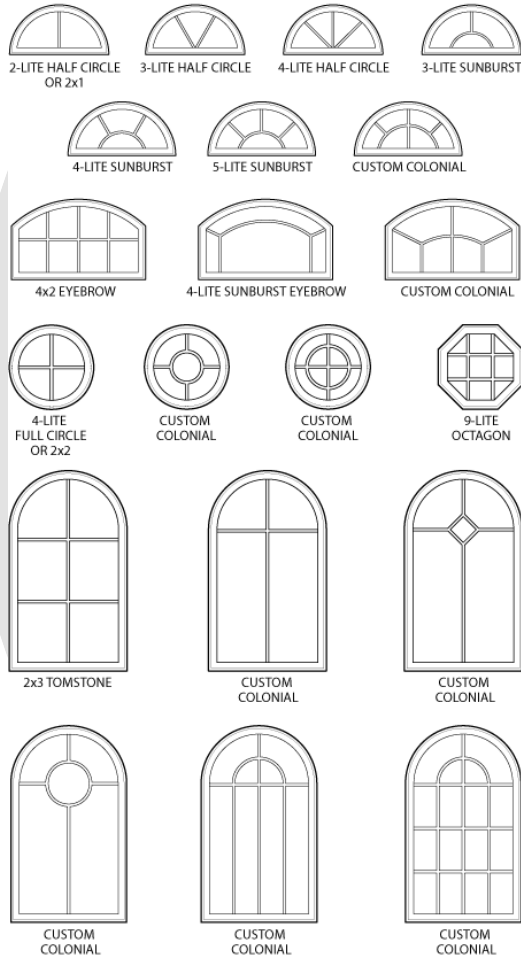
Results Log

Ready

Exchange Rate: 1 € = 3.6200 RON Database: serverdata\RaDemo:3.8.1.4



نماذج فتحات الشبابيك





نماذج فتحات الشبابيك



HmsAlwrd.com



Doors



DOORS THAT HIT YOU
ON THE WAY IN





Doors





Doors





Doors

- ❖ **Internal doors must be positioned in order to maximize the usable room space.**
- ❖ **It is necessary to decide whether a door should open inwards or outwards. Normally doors open into the room.**
- ❖ **The width of doors is determined by it's use and the room into which leads. The minimum inside width of a door opening is 70cm.**



Door Types

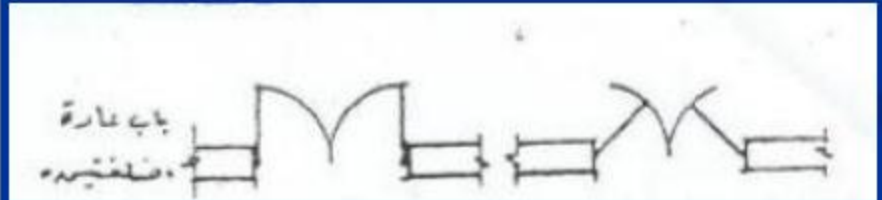
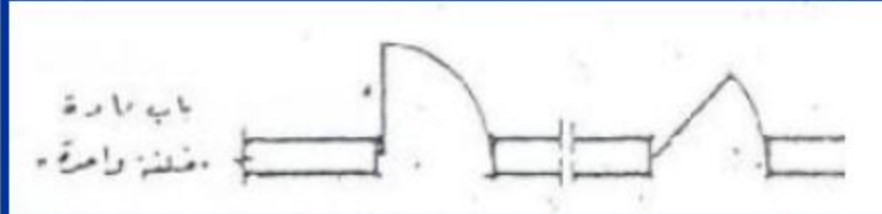
- ❖ Hung right or left door.
- ❖ Swinging double door.
- ❖ Pivoting door.
- ❖ Sliding door.
- ❖ Revolving door.
- ❖ Folding door.
- ❖ Telescopic door.
- ❖ Roller shutter door.
- ❖ Fire door.

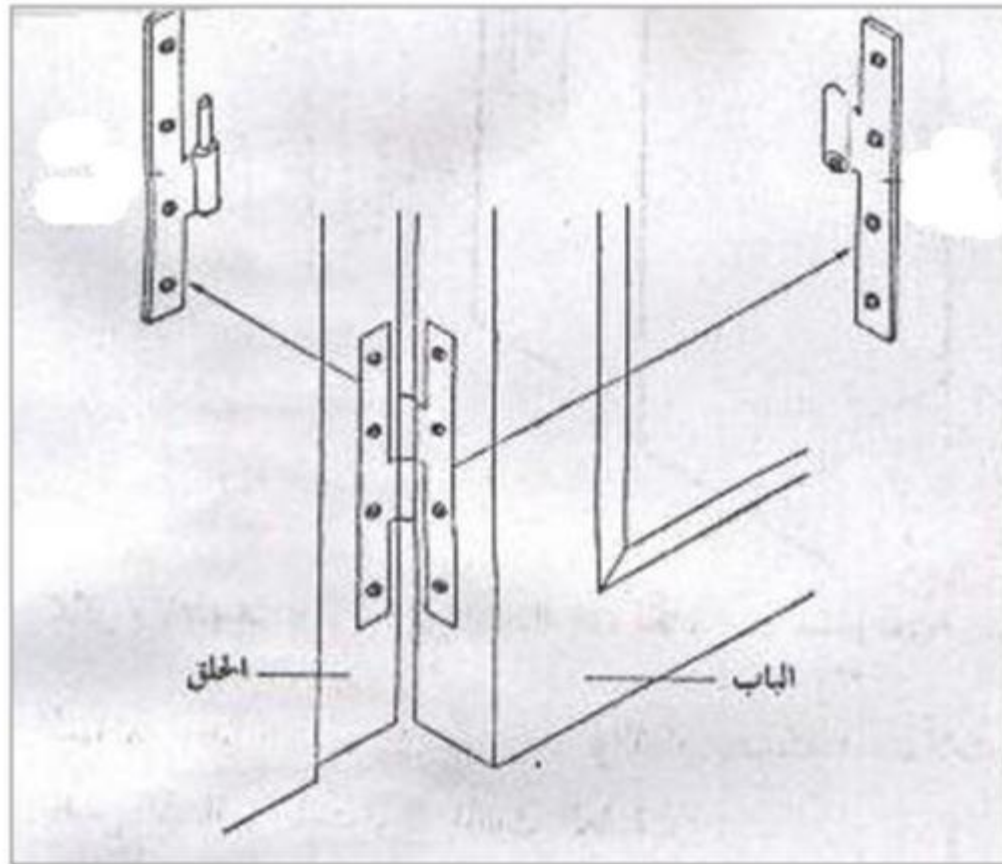


Door Types

النظام المفصلي Hinge

ويتكون اما من ضلفه واحدة او ضلفتين وتتحرك الضلف حول مفصلات بحركة دورانية حول محور.

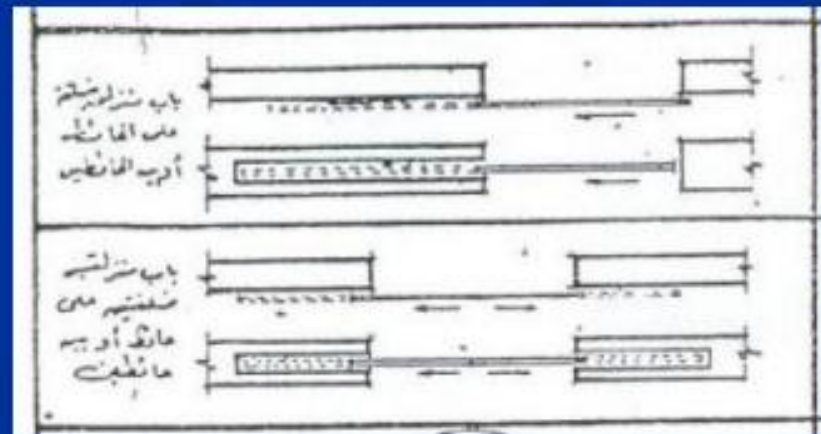




باب منزلق: Sliding

يُثبت هذا الباب على عجل (بكر) وقضيب خاص ليحدد مسار فتحه. وقد يتكون هذا الباب من دلفة واحدة أو أكثر. وهذا النوع من الأبواب لا يستهلك مساحة من الغرفة.

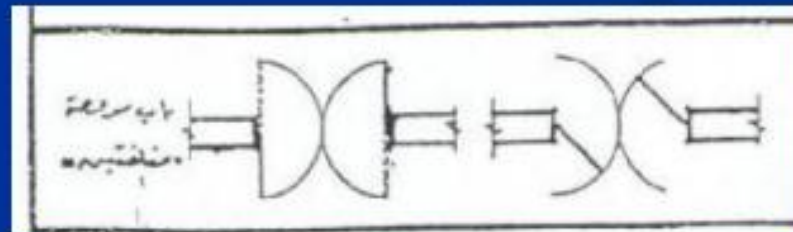
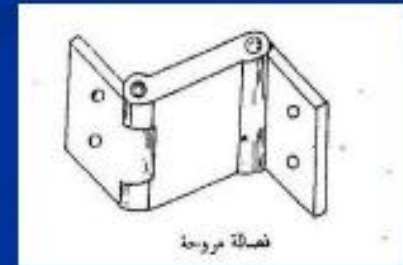
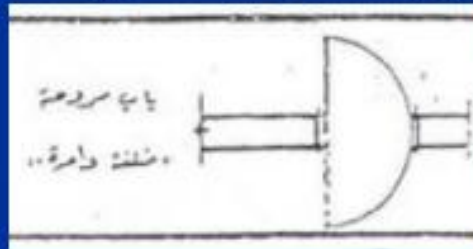
A sliding door is a type of door which opens horizontally by sliding, usually parallel to a wall. Sliding doors can be mounted either on top of a track below or be suspended from a track above and some types 'disappear' in a wall when slid open.^[1] There are several types of sliding doors such as pocket doors, Arcadia doors, and bypass doors..



Swing : الابواب المروحة :

الأبواب التي يمكن فتحها بمجرد الدفع من جانب و ترجع بصورة آلية الى الوضع المغلق عند تركها . و تستخدم في الأماكن التي بها حركة عبور كبيرة ، و الأماكن التي تؤدي من اقسام الخدمة الى اماكن تقديم الطعام ، و وبين حجرات التعقيم و العمليات في المستشفيات ، و تفتح هذه الأبواب ١٨٠° .

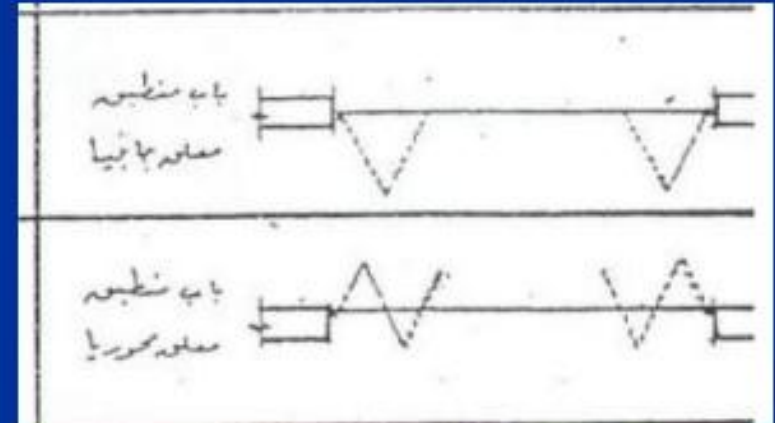
The swing door, available in single and double versions, can be opened in both directions. These doors are fixed on pivot hinges which open the leaves to 90° on either side of the opening. The leaves have rounded joints enabling total opening to 180°.



أنظمة باب منطبق : Accordion

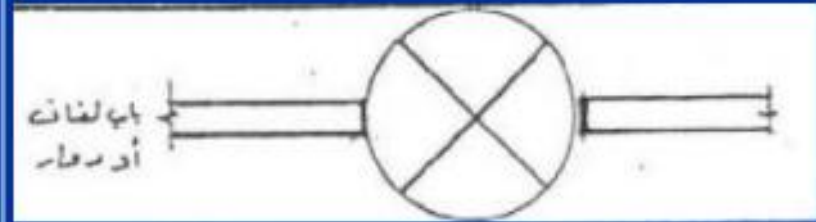
يتكون من ضلفتين أو أكثر طبقاً لمقاسات الفراغ المعماري .
و تتحرك حول محور رأسي وأفقى بواسطة عجل مثبت بأعلى الضلف مقابل
دليل من أسفل داخل مجرى الحلق . والمفصلات تجمع بين الضلف وبعضها .

an interior door that opens by folding back in sections (rather than by
winging on hinges)



• أنظمة باب دوار : Revolving door

يتكون من ٢ ضلفة أو ثلاثة أو أربعة ضلف . يحدد طبقا للمسقط الأفقي . يستخدم لأبواب مداخل المباني الإدارية و الفنادق . يتحرك حول محور رأسي بواسطة ماكينة خاصة بمركز الباب.





Door Types

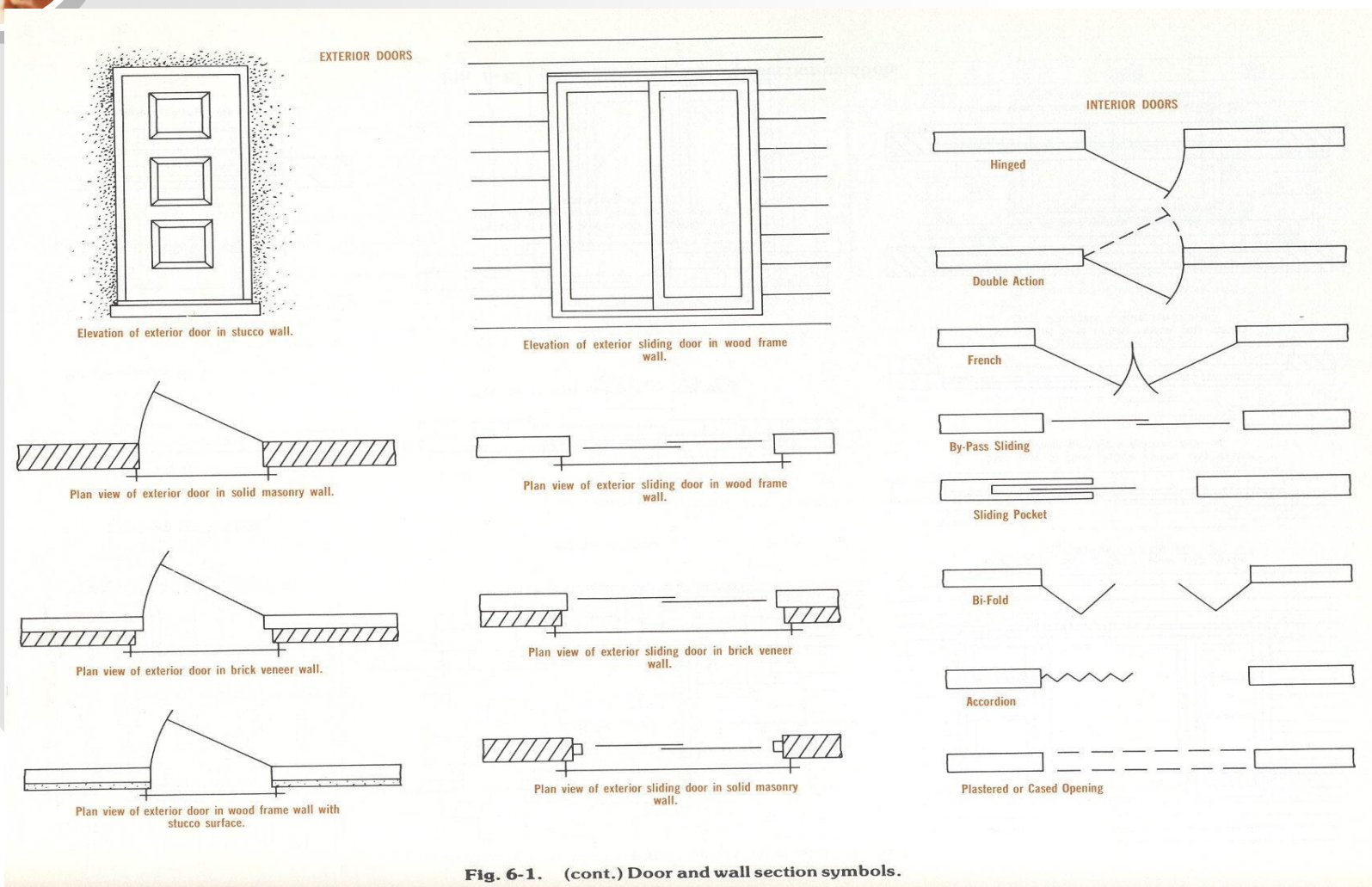
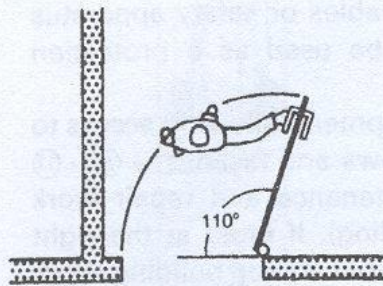


Fig. 6-1. (cont.) Door and wall section symbols.

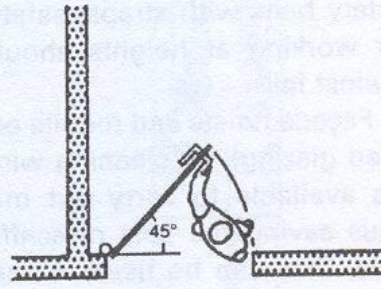


Door Types

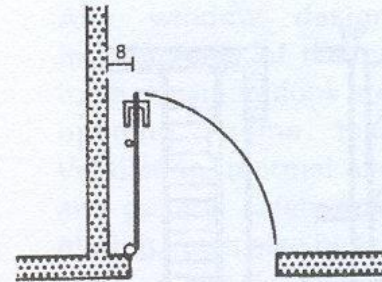
DOORS: INTERNAL



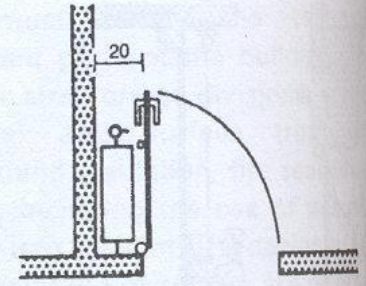
① Generally, wrongly hung



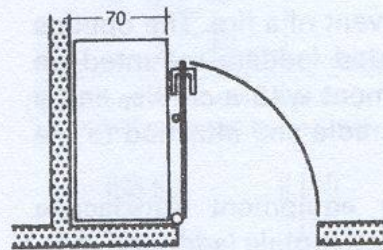
② Generally, correctly hung



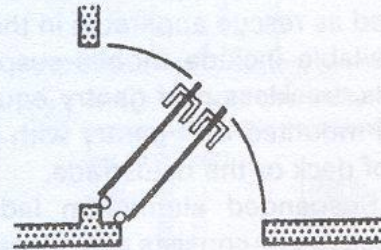
③ Min distance from wall



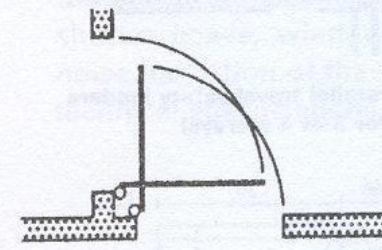
④ With radiator



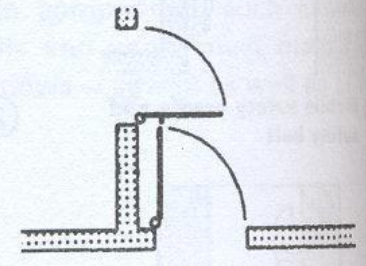
⑤ With cupboard (good arrangement)



⑥ Arrangement of two corner doors, opening into the same room



⑦ Two doors wrongly fitted



⑧ Two doors correctly fitted



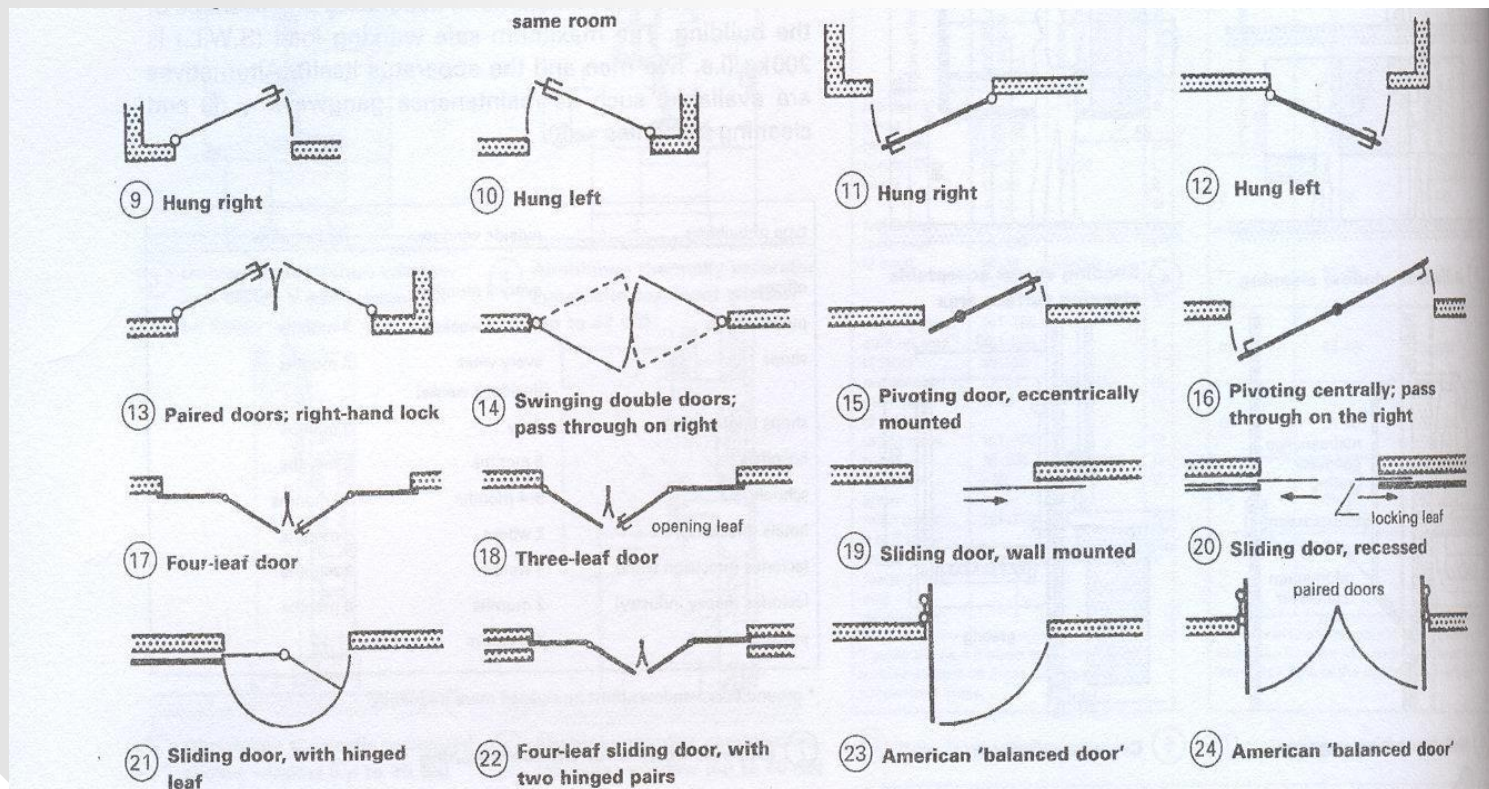


Doors



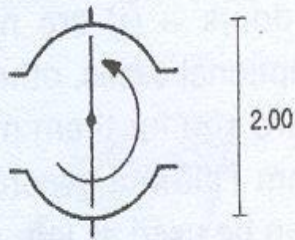


Door Types

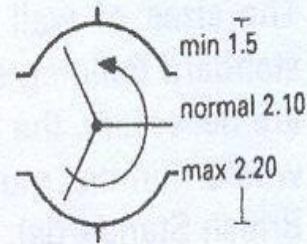




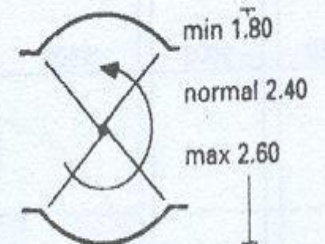
Door Types



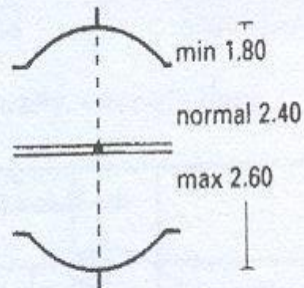
① Revolving door, two panels



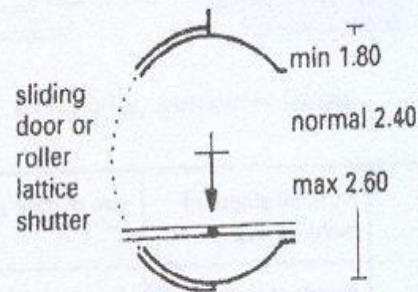
② With three panels



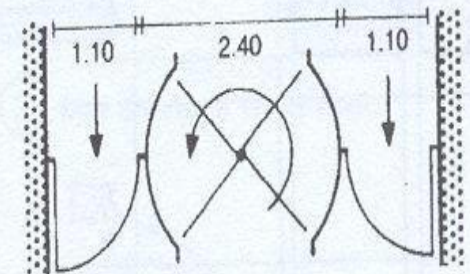
③ With four panels



④ Four panels, folded back



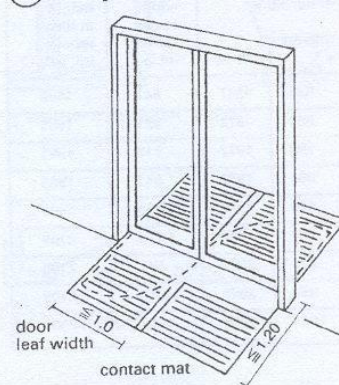
⑤ Door assembly pushed to side



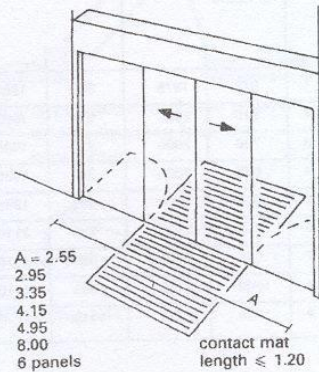
⑥ Revolving door with extra emergency exits



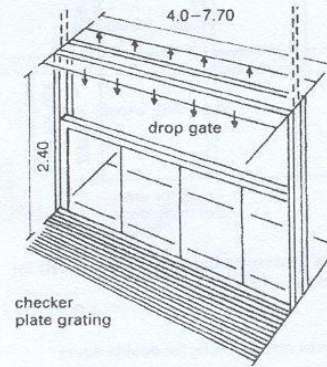
Door Types



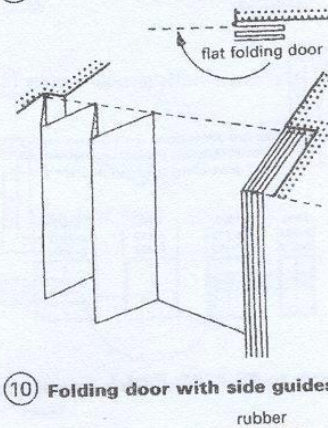
⑦ Automatic hinged doors



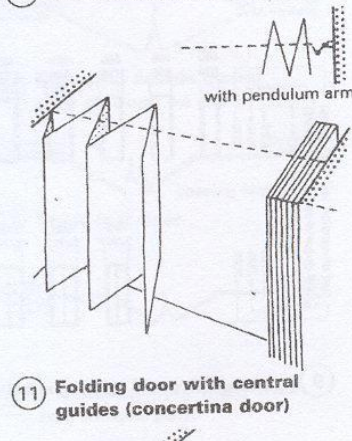
⑧ Automatic sliding doors



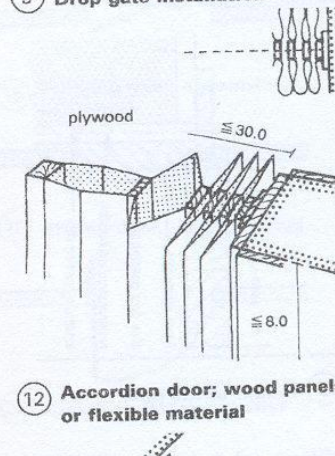
⑨ Drop gate installation



⑩ Folding door with side guides



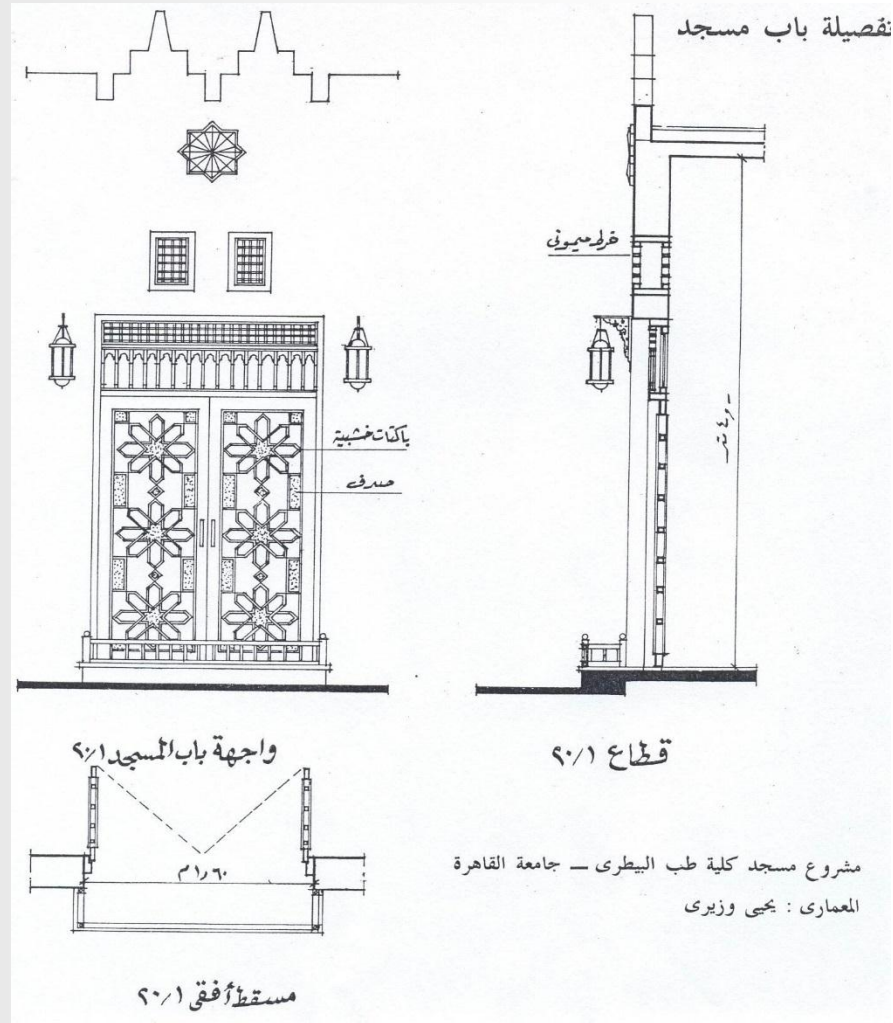
⑪ Folding door with central guides (concertina door)



⑫ Accordion door; wood panels or flexible material

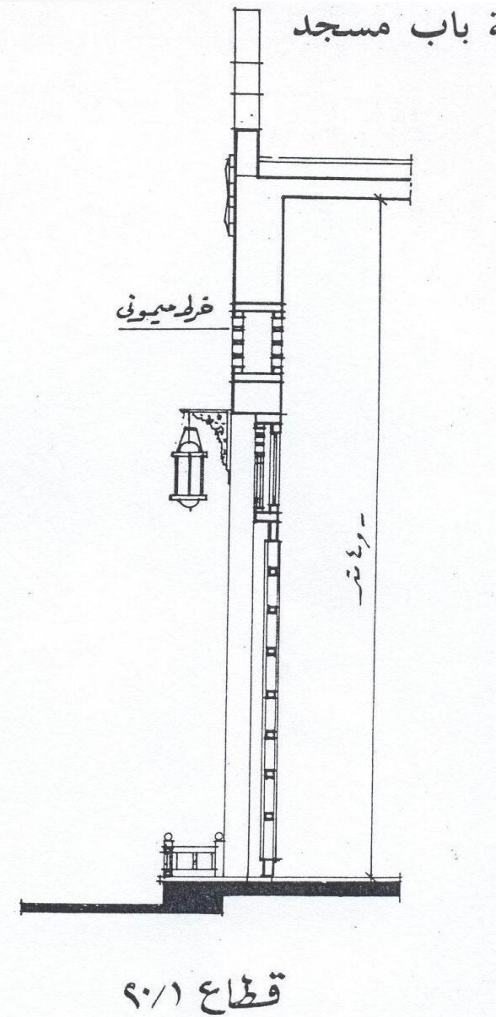
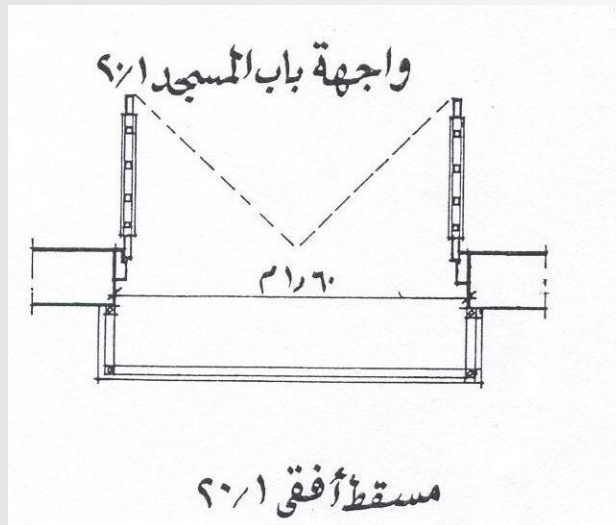


Door Types





Door Types





تصميم الفتحات المعمارية





تصميم الفتحات المعمارية



■ تؤدي الفتحات المعمارية (الأبواب والنوافذ والواجهات الزجاجية) دورا رئيسيا في المبنى من حيث تزويده بالتهوية الطبيعية الكافية والإضاءة الطبيعية اللازمة وبما تتطلب الحاجة الداخلية لهما، كما أنها تعمل على توفير مجال الرؤية المطلوبة خارج المبنى. وهناك عدد من العوامل والاعتبارات التي يجب على المصمم أخذها بعين الاعتبار عند دراسة الفتحات واختيارها عند تصميم المباني، وهذه العوامل:

- عوامل واعتبارات معمارية.
- عوامل واعتبارات حرارية
- عوامل واعتبارات اقتصادية
- عوامل واعتبارات تتعلق باحتياجات الإنسان .



وعند الحديث تصميم الفتحات تبرز عدة عناصر يجب دراستها
وأخذها بعين الاعتبار وهي:

❖ **موقع وتوجيه الفتحة.**

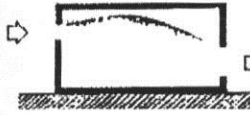
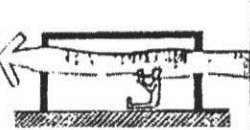
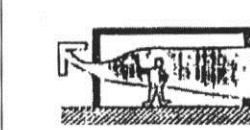
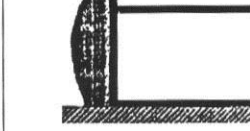
❖ **أبعاد وقياسات الفتحة.**

❖ **نوع المادة المصنوعة منها الفتحة.**

إن العناصر السابقة مترابطة ومتداخلة مع بعضها البعض
بصورة كبيرة جدا مما يجعل من الصعوبة الحديث عن
واحدة منها دون الإشارة إلى العناصر الأخرى.

Ventilation

جدول رقم (10/6) تأثير منسوب وإتجاه الفتحات المعمارية في توزيع التهوية في الداخل

 فتحة دخول علوية وخروج سفلية تؤدي إلى توزيع سيء في التهوية	 فتحات في مستوى معيشة الإنسان تؤدي إلى توزيع مناسب للتهوية	 فتحات علوية متقابلة تؤدي إلى حدوث ركود في الفراغ الداخلي
 مدخل ومخرج على إرتفاع عالي رياح بسيطة الحركة	 مدخل هواء صغير ومخرج كبير سرعة الرياح عالية	 مدخل هواء كبير ومخرج صغير سرعة الرياح منخفضة
		

تأثير الطابق الموجودة به الغرف على شكل التهوية داخله



❖ وبصورة عامة يمكن القول بأنه يجب أن تكون **مواقع الفتحات** المعمارية واتجاهاتها متناسبة مع المنطقة المناخية التي يقع فيها المبنى. ففي المناطق **الحارة** يراعى تقليل المساحات الزجاجية بشكل عام وبخاصة على **الواجهات الجنوبية** والأكثر تعرضا للإشعاع الشمسي المباشر وغير المباشر لتفادي الكسب الحراري.



* مساحات الفتحات المعمارية والمواد المصنوعة منها.

❖ تؤثر **مساحة الفتحات** ونوع **المادة المصنوعة** منها تلك

الفتحات على تحديد مقدار تدفق الإشعاع الشمسي إلى داخل المبنى. ويرتبط ذلك **باتجاه** تلك الفتحات، حيث أن مساحة الفتحات مرتبطة بشكل أساسي باتجاهها.

❖ ورغم أن معدل تدفق الطاقة الشمسية خلال الفتحات المعمارية (النوافذ وغيرها) والواجهات الزجاجية يعتمد بصورة أساسية على شدة **الإشعاع** الشمسي الساقط عليها إلا أن **مساحة الفتحة** ونوع **المادة** والزجاج المستخدمين فيها يشكلان عنصرين مهمين في تحديد وحساب ذلك المعدل.



فتحات الابواب

تشيد الابواب الخارجية والداخلية داخل فتحات الحوائط المعدة لذلك وقد تصنع الأبواب من الاخشاب اللينة كالخشب الموسكى الشائع الاستعمال او الخشب الصلب او المعادن .
ويعتبر مقاس ارتفاع فتحة الباب مهم جدا في تشييد المباني حيث يتحدد عليها نسب كثيرة في المبني مثل ارتفاع فتحة الشباك او ارتفاع مواد التشطيبات الداخلية او خلافه .

وعلى ذلك نجد ان هذا الارتفاع يتحدد بعوامل اهمها :
١ . متوسط ارتفاع الانسان .



Doors





فتحات الابواب



٢. ارتفاع الوحدة البنائية المستعملة في المباني مثل ارتفاع الطوبة او الحجرة او خلافه – حيث من الشائع ارتفاع فتحة الباب في المباني السكنية العادية **220- 210 cm**.

اما عن فتحة الباب فهي متغيرة على حسب استعمال الباب نفسه على ان يكون اقل عرض له **70 cm** أي اكبر من مقاس عرض الانسان .



كما قد يضاف إلى بعض أنواعها وظائف فرعية لأغراض خاصة ويتلخص ذلك في الآتي:

١. القوة
٢. الأمن
٣. الخصوصية
٤. عازل للحرارة والصوت
٥. مقاوم للحريق والعوامل الجوية
٦. سهولة التشكيل





Doors

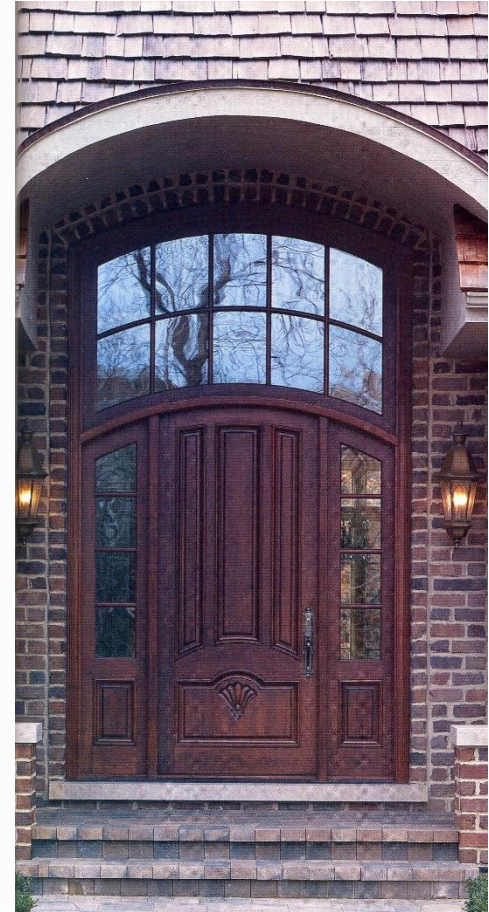




- ❖ تعتبر الابواب والشبابيك فتحات في المباني فهي عناصر مهمة في تشيد المباني ليس فقط لربط اجزاء المبنى الداخلية ولكنها لربط الطبيعية الخارجية بالمبنى ايضا ولكل من الابواب و الشبابيك وظائف خاصة الابواب
- ❖ وظيفة الابواب الرئيسية انها وسيلة الدخول والخروج للمباني او الحجرات الداخلية بها .
- ❖ اما الوظيفة الرئيسية للشبابيك فهي وسيلة للتهوية والإضاءة والنظر من خلالها على المناظر الطبيعية الخارجية او الداخلية للمباني



Doors





Doors



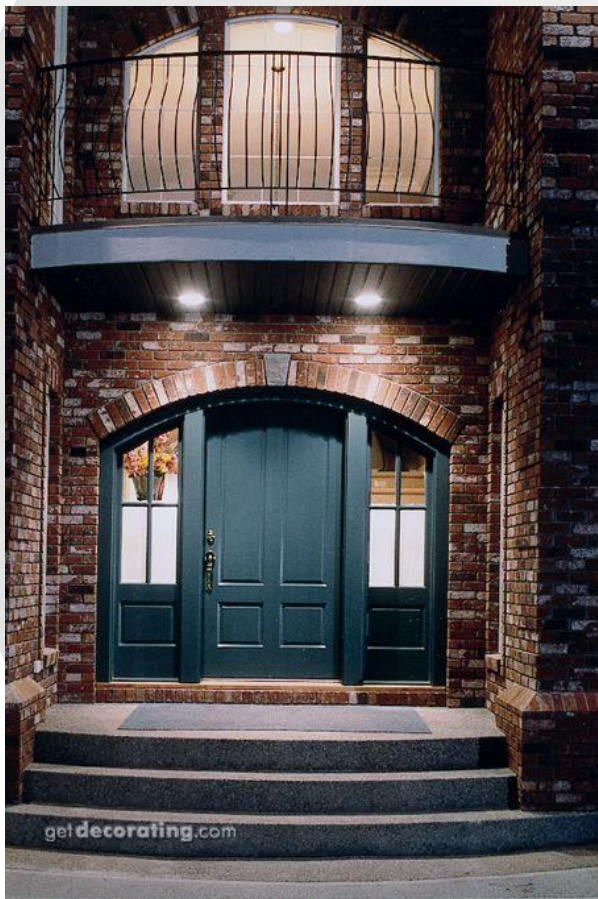


Doors





Doors





Doors



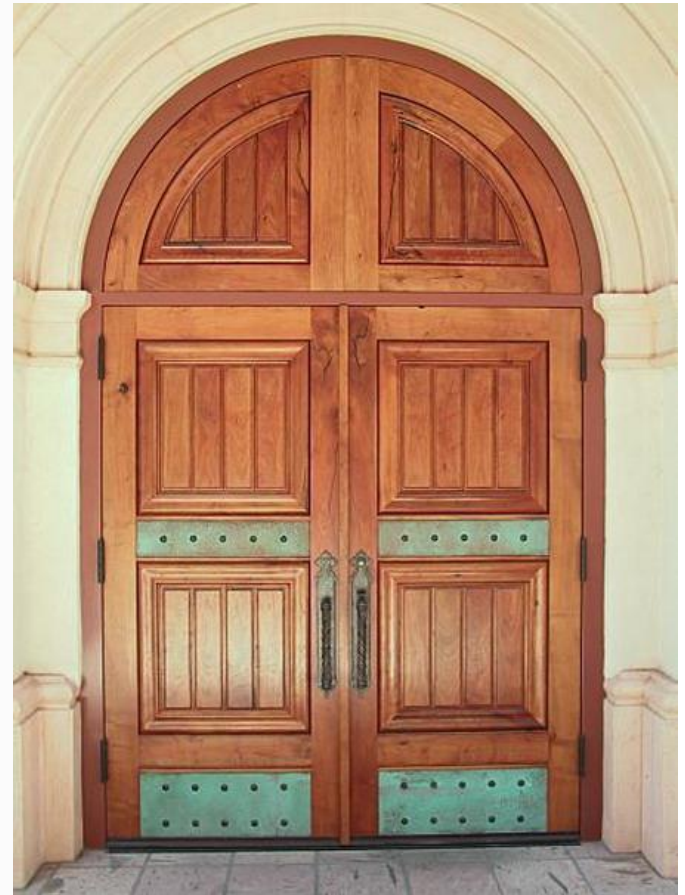


Doors





Doors





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