



Metal Doors & Frames

A door is a moveable barrier used to cover an opening. Doors are used widely and are found in walls or partitions of a building or space. A door can be opened to give access and closed more or less securely using a combination of latches and locks.

Doors are nearly universal in buildings of all kinds, allowing passage between the inside and outside, and between internal rooms. When open, they admit ventilation and light. The door is used to control the physical atmosphere within a space by enclosing it, excluding air drafts, so that interiors may be more effectively heated or cooled. Doors are significant in preventing the spread of fire. They act as a barrier to noise.

They are also used to screen areas of a building for aesthetic purposes, keeping formal and utility areas separate. Doors also have an aesthetic role in creating an impression of what lies beyond. Doors are often symbolically endowed with ritual purposes, and the guarding or receiving of the keys to a door, or being granted access to a door can have special significance. Similarly, doors and doorways frequently appear in metaphorical or allegorical situations, literature and the arts, often as a portent of change.

Many kinds of doors have specific names, depending on their purpose. The most common variety of door consists of a single rigid panel that fills the doorway. Many variations on this basic design are possible, such as "double" doors that have two adjacent independent panels hinged on each side of the doorway.

Most doors are hinged along one side to allow the door to pivot away from the doorway in one direction but not in the other. Doors can be hinged so that the axis of rotation is not in the plane of the door to reduce the space required on the side to which the door opens.

Doors can be used as general doors, commercial doors, residential doors, industrial doors, scientific doors, fire resistant doors, acoustic doors as well as security doors. The same can be offered with honeycomb paper core, mineral wool and PUF insulation if required. Manufactured under stringent internationally certified procedure with state of the art CNC equipment. We offers a wide range of pressed steel products like doors & windows.



Types of Doors

Scientific Door: Scientific doors facilitate highest standards of hygiene for cleanroom environment in industries like pharmaceuticals, Bio-technologies, Micro Electronics Industries and hospitals. These fully flush type doors available in galvanised steel and stainless steel are provided with a range of indigenous and imported ironmongery in stainless steel. These door sets can be custom designed for individual project requirements while incorporating special features in addition to the vision panels, ironmongery and wide range of color finish.

Fire Door: Fire doors are available in fire resistant levels from 30 minutes up to 2 hrs, all tested to BS 476 Part 22 at CBRI, Rookee. These door sets can be made in very large sizes with options for glazing, fire resistant self closing louvers, single or double door sets, optional fixed over panels and optional temperature rise (insulation) configuration.

General/ Commercial Door: High duty general purpose metal door sets are available in sizes up to 2600mm wide for double door sets and 3000mm high. Capable of accepting glazing in many configurations with air vents, louvers and wide range of hardware.

Secure Door: Special attention is paid to construction details and the addition of security hinges, multipoint locks, reinforced laminated cores and high security glazing which produces a range of secure door sets that are suitable for high security applications. The level of protection required will determine the degree of sophistication of construction.

Technical Specification for General / Commercial / Scientific Doors and Frames

Description	Metal Doors and Frames
Construction	<p>Door leaf from 0.8 mm / 1.2 mm thick slip coated pre-galvanised steel sheet to ASTM A527 / ASTM A525, JIS G 3302 or BS 2989 (1994). Zinc coating 80-120 g/m². Lock formed panels with internal stiffeners, 3.0mm thick hinge reinforcing, hardware mounting plates and lock protection.</p> <p>Stiffeners are used to provide extra strength and to prevent de-formation in doors</p> <p>Door frame from 1.2 mm / 1.6 mm thick pre-galvanised steel sheet with mitred and welded corners, frame stretchers, hinge reinforcing plates, fixing plates and hardware mounting plates.</p>
Core material	Door leaf filled with either Honeycomb kraft paper core / Mineral wool / Rock wool / Glass wool / PUF insulation dependant on duty.
Finish	Epoxy / Pure Polyester Powder coated / Zinc coated primer with PU Paint surface.
Fixings	Fixing through frame by expansion bolt Mortar straps
Frame Assembly	Welded construction with frame spreaders. Bolted frame construction. Knock-down frame construction for wrap around frames.
Glazing	Glazing to door leaf. Glazed over panels in frames.
Louvers	Louver panels to door leaves. Fire resistant ventilators.
Acoustic Properties	Up to RW 44 for 60mm thick door leaves with special frames and ancillary seals.
Sizes	Up to 6000 mm high and 3000 mm wide subject to test data limitations.



Fire Rated Doors & Frames

A fire rated door is a type of door or movable barrier used as part of a passive fire protection system within buildings to prevent the spread of fire or smoke between separate sections. It is usually the only means of allowing people to pass through a fire-resistant wall.

Apart from the door leaf (the swinging panel of the door) there is the door frame which also has to meet fire rated regulations, intumescent strips, smoke seals, door hardware and the structure that holds the fire rated door assembly in place. Together, these components form an assembly, typically called a "doorset" which holds a rating, in hours, specifying the amount of time it is able to resist a fire at a given temperature. All of the components of the fire rated door assembly must bear a listing agencies label i.e. CBRI / UL / ARAI certification to ensure the components have been tested to meet the fire rating requirements.

Door Hardware

Door hardware includes, but is not limited to:

- Automatic closing devices
- Latches
- Door sweeps
- Locks
- Hinges
- Thresholds

Seals

Edges of a fire door usually need to have fire rated seals which can be composed of:

- An intumescent strip, which expands when exposed to heat
- Neoprene weather stripping
- Gaskets to prevent the passage of smoke

Intumescent seals are crucial in maintaining the performance of a fire resistant door, and as such, the correct seal should always be used. Seals may vary in chemical composition, expansion rate, expansion volume, and/or charring characteristics. Some fire doors are equipped with internal windows which also have a rating, or have been incorporated at the time of the door test and be subject to the overall door's product certification. Fire-resistive windows must remain intact under fire conditions and hose stream impact resistance, and can include:

Wired glass typically withstands the fire, whereas the sodium silicate liquid also acts to insulate heat transfer, due to the endothermic action of this chemical.

Regulations

All components are required to adhere to product certification requirements that are acceptable to the local Authority such as CBRI (Central Building Research Institute, Roorkee) by meeting the requirements of the local building code and fire code. The regulatory requirement will change from country to country.

Normal Operation

Most fire rated doors should be kept closed at all times, however some are designed to stay open under normal circumstances, only to shut automatically in the event of a fire. Whichever method is used, the door's movement should never be impaired by a doorstop or other obstacle. The intumescent and smoke-seal bounding of fire rated doors should be routinely checked, as should the action of the door closer and latch.

Some fire rated doors are held open with an electromagnet, which may be wired to a fire alarm system. If the power fails or the fire alarm is activated, the coil is de-energized and the door closes on its own.

Rated fire rated doors are tested to withstand a fire for a specified period. There are 20, 30, 45, 60, 90, 120, 180 and 240 minute-rated fire rated doors that are certified by an approved laboratory. The certification only applies if all parts of the installation are correctly specified and installed. For example, fitting the wrong kind of glazing may severely reduce the door's fire resistance period.

Construction and Installation issues

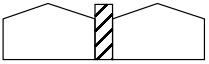
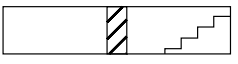
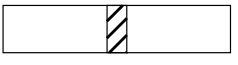
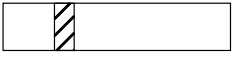



As well as ensuring the door is hung properly and squarely, it is also very important that where a fire door is installed, any gaps left in the opening between the wall and the door frame must be properly filled with fire resisting material.



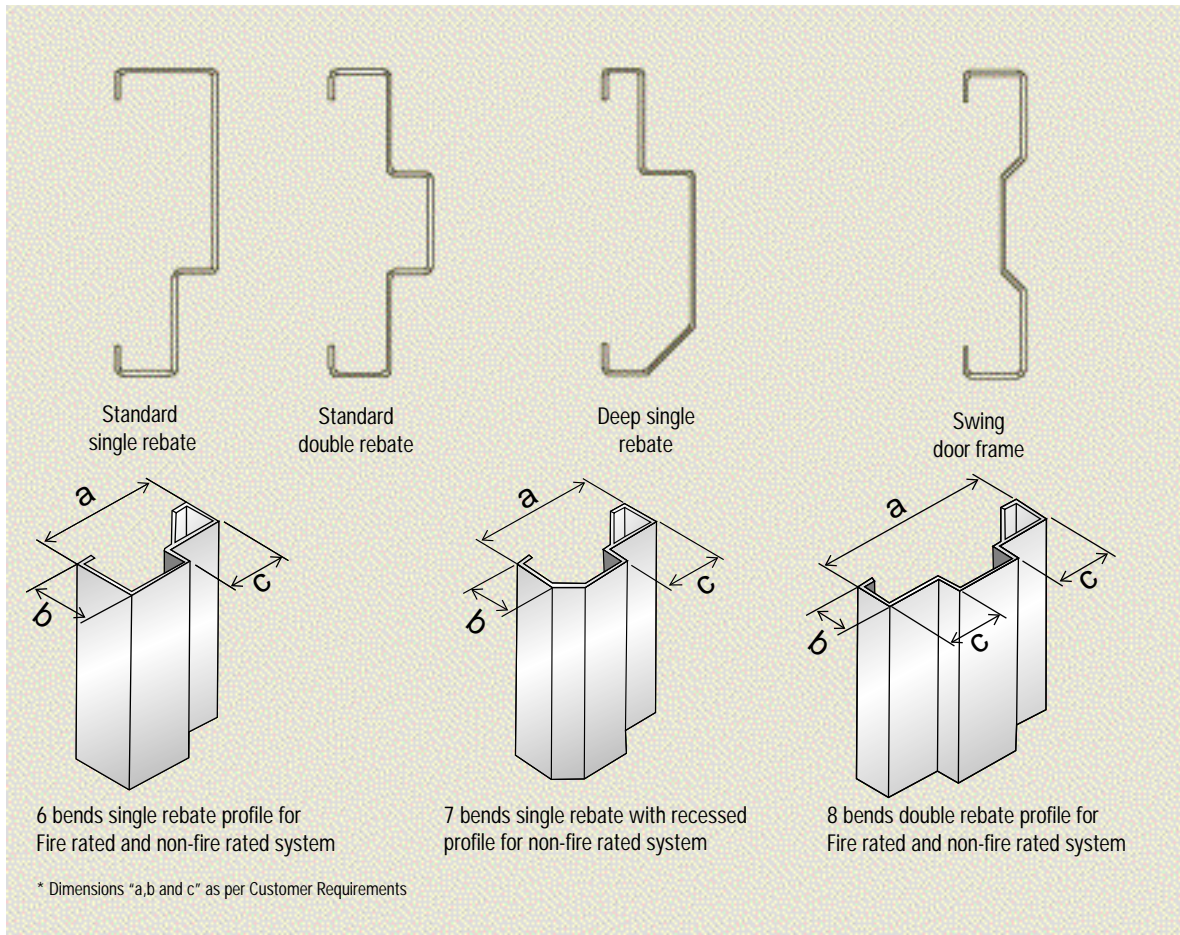
Technical Specification for Fire Resistant Doors & Frames

Test Standards	BS476:Part 20 and Part 22, 1987 MS 1073:Part 3:1996 ISO 9002:1994
Door Leaf	46mm thick leaf formed from 0.8 / 1.2mm thick Skin pass electro galvanized steel reinforced with internal stiffener, fully insulated with 138 kg/m3 Mineral wool, complete with preparation for lock formed, 4mm thick hinge reinforcing plates, hardware mounting plates and Lock reinforcement.
Door Frame	1.6 mm thick skin pass electro galvanized steel, seamless welded or knock-down constructions complete with 4mm thick hinge reinforcing plates, fixing straps, hardware mounting plates, mortar guards and Lock reinforcement. Standard Single and Double Rebate profile.
Finish	Primer etching based coats only unless otherwise specified. Epoxy / Pure Polyester Powder coated / Zinc coated primer with PU Paint surface.
Hardware	Provided as standard hinges, door closer and mortise lock set with lever handle.
Core material	Door leaf filled with either Honeycomb kraft paper core / Mineral wool Rock wool / Glass wool / PUF insulation dependant on duty.
Double-Leaf	Equal or unequal door leaves
Maximum Sizes	Door frame sizes Width x Height (mm) Single Leaf 1100 x 2400mm Double Leaves 2200 x 2400mm further upon request
Acoustic Performance	STC 41 to 45 tested in accordance to ASTM E90

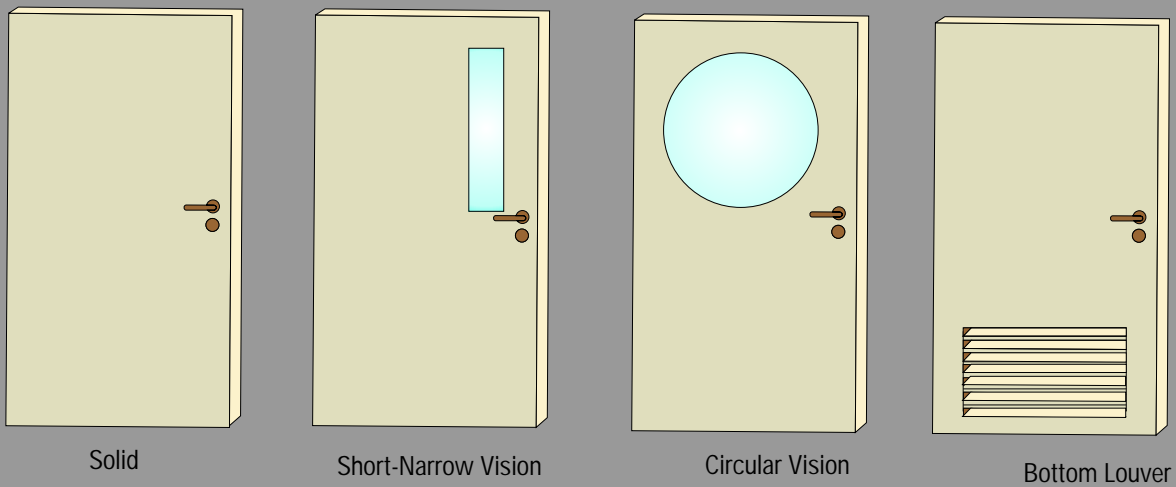
Fire Rated Door Openings

Opening	Wall Rating	Door and Frame Rating	Description and Use
	4 Hour	3 Hour (180 minutes)	These openings are in walls that separate buildings or divide a single building into designated fire areas.
	2 Hour	1-1/2 Hour (90 minute)	Openings of this type are used in enclosures of vertical communication or egress through buildings. Examples of these types of openings include stairwells and elevator shafts.
	1 Hour	1 Hour (60 minute)	These door and frame assemblies divide occupancies in a building.
	1 Hour	3/4 Hour (45 minute)	For use where there are openings in corridors or room partitions.
	2 Hour	1-1/2 Hour (90 minute)	This opening is in a wall where there is the potential for severe fire exposure from the exterior of the building.
	1 Hour	3/4 Hour (45 minute)	This opening is in an exterior wall that has the potential to be exposed to moderate to light fire from the exterior of the building.
	1 Hour	1/3 Hour (20 minute)	These openings are in corridors where smoke and draft control is required. The minimum wall rating is 1 hour.

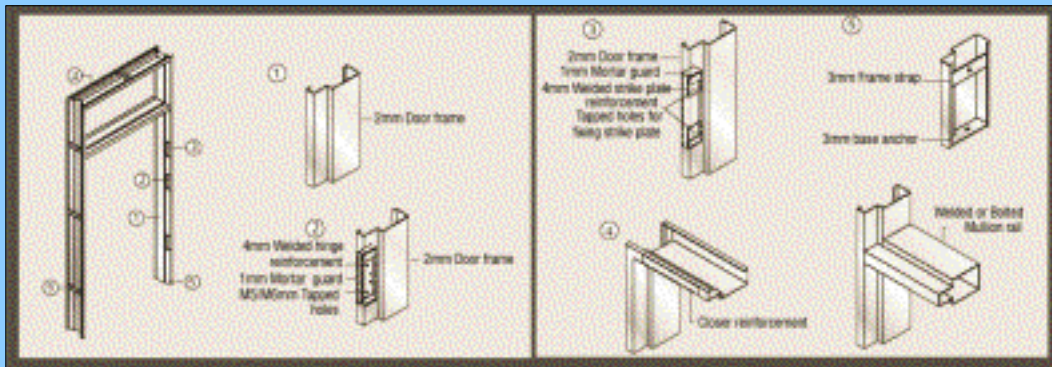
Frame Profiles



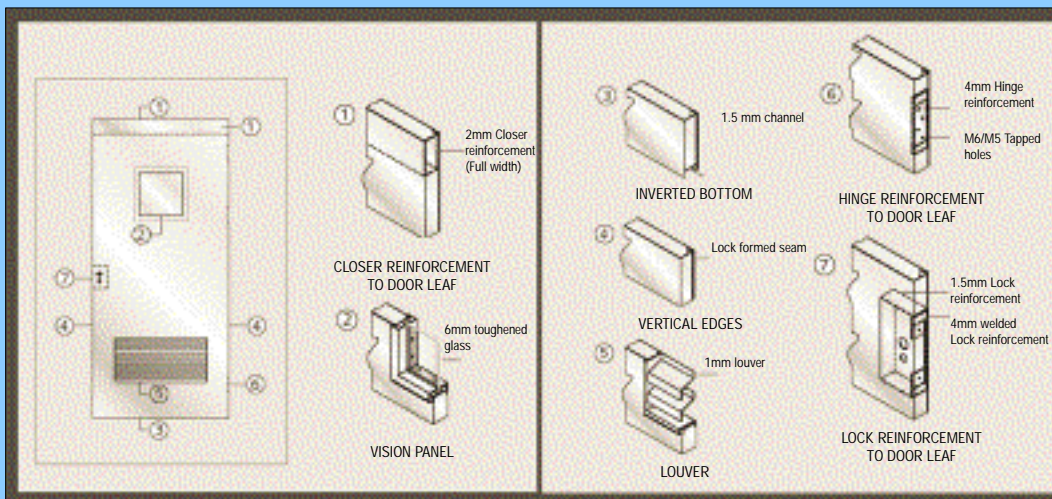
Door Design



Door Frame construction



Door Leaf construction



Note: The sizes of single leaf and double leaf doors depend on customer requirements and site conditions. Ironmongery, accessories, vision panels are subjected to customer choices

CORES

HONEYCOMB

- Superlative resistance to impact
- Smooth flat surface
- Extreme durability
- High shear strength
- Prevents decay and destruction by pests
- Versatility: permits modification

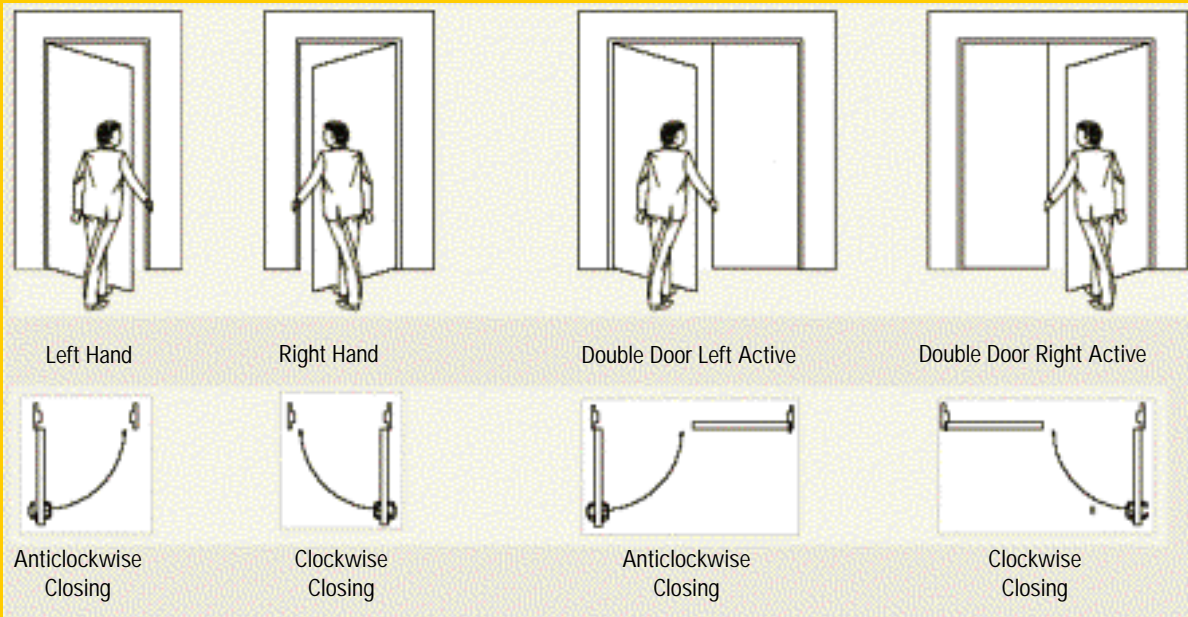
MINERAL WOOL

- Superlative resistance to heat
- Smooth flat surface
- Extreme durability
- Prevents decay and destruction by pests
- Excellent Acoustic Properties

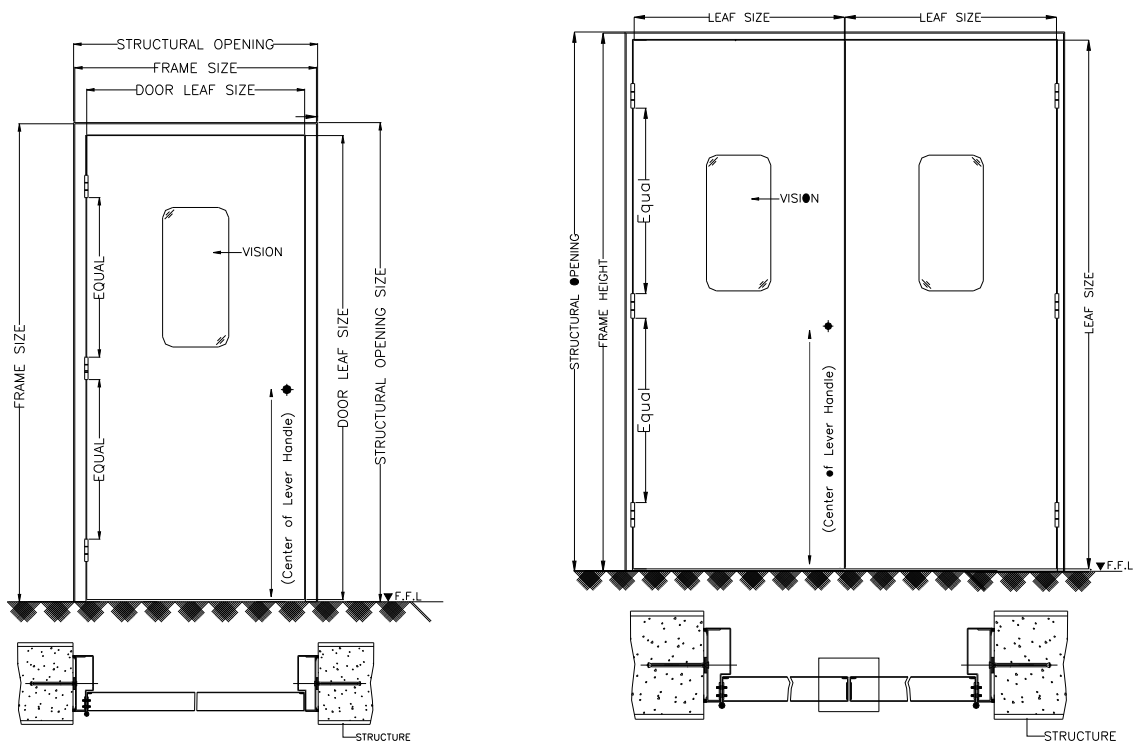
POLY URETHANE FOAM

- Stops Air Infiltration
- High Insulation Value
- Moisture Resistant
- Light Weight
- Excellent Adhesion
- Code Approved

Door Handing System



Door Measuring System



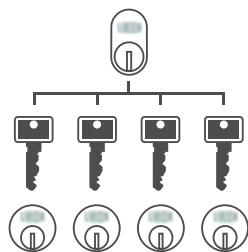
Ironmongery and Security Solutions

Masterkey systems offer control over the movement of people within a building or buildings. It is most important that the keying requirements of a building are accurately and correctly detailed to provide security and accessibility for the keyholders of the building.

Any recommendations must relate the security of the system to the convenience of movement within the building.

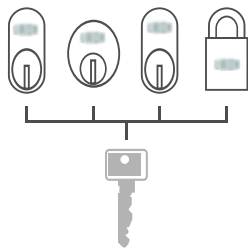
Too much reliance on one side of the security/convenience balance will either sacrifice the security offered or lose the convenience factor. It is thus vitally important to strike the right balance.

Examples of the principle of masterkeying are shown below.



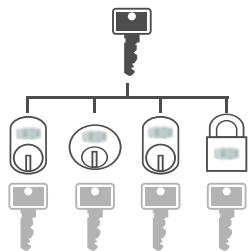
Individually Keyed System (KD)

With an individually keyed system, each cylinder can be opened by its individual key.



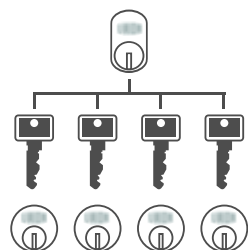
Keyed Alike (KA)

This system allows for a number of cylinders to be operated by the same key. It is ideally suited to residential applications such as front and back doors.



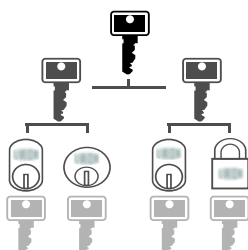
Master Keyed (MK)

A master-keyed system involves each lock having its own individual key which will not operate any other lock in the system, but where all locks can be operated by a single master-key.



Grand Master Keyed (GMK)

This is an extension of the master-keyed system where each lock has its own individual key and the locks are divided into 2 or more groups. Each lock group is operated by a master-key and the entire system is operated by one grand master-key.



Common Entrance Suite (CES)

This system is widely used in apartments, office blocks and hotels. Each apartment (for example) has its own individual key which will not open the doors to any other apartments, but will open common entrance doors and communal service areas.



Selection of Doors & Ironmongrey

Doors

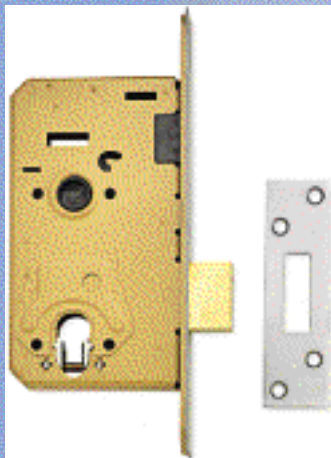
STANDARD SIZE OPTIONS								
Finished Wall Opening size in mm		Door Reference			Frame size in mm		Shutter height 2048 mm	
Width	Height	GD	SD	FD	Width	Height	Active Width	Inactive Width
750	2100	GD 75	SD 75	FD 75	740	2095	658	
900	2100	GD 90	SD 90	FD 90	890	2095	808	
1000	2100	GD 100	SD 100	FD 100	990	2095	908	
1125	2100	GD 112	SD 112	FD 112	1115	2095	1033	
1200	2100	GD 120	SD 120	FD 120	1190	2095	1108	
1500	2100	GD 150	SD 150	FD 150	1490	2095	1033	369
1500	2100	GD 150	SD 150	FD 150	1490	2095	701	701
1800	2100	GD 180	SD 180	FD 180	1790	2095	851	851
2000	2100	GD 200	SD 200	FD 200	1990	2095	951	951
2300	2100	GD 230	SD 230	FD 230	2290	2095	1101	1101

GD – General / Commercial Door, SD – Scientific Door, FD – Fire Resistant Door

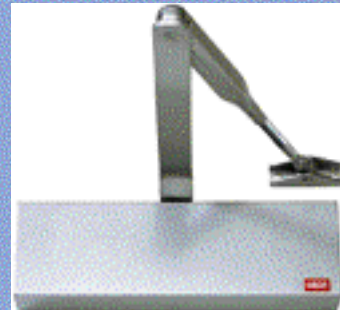
Ironmongrey

Description	Specification
Door Closer	with Standard Arm / with Hold open arm
Door Closer - Heavy Duty	with Standard Arm / with Hold open Arm
Door Closer - Concealed	with Standard Arm / with Hold open Arm
Door Coordinator	
Door Drop Seal	Upto 1114/1314 mm length
Door Hinges	4" X 3" X 3 mm Stainless sheet ball bearing butt Hinges
Flush Bolts	300 / 600 / 900 / 1200 mm long
Pull Handle	19mm x 254mm Stainless Steel Pull handle
Pull Handle	19mm x 150mm Stainless Steel Pull handle
Handle D -Type	D Type SS Mortise Handle On Rose 19mm
Dead Lock	SS 225mm
Lock	Both side key 70mm Cylinder
Lock	SS Mortise Latch
Mortise Lock Body	
Panic Bar Ordinary	Two Door
Panic Bar Ordinary	Single Door

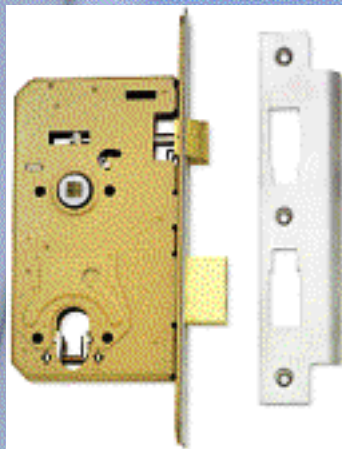
Mortise Locks and Accessories



Mortise with Dead Lock



Hydraulic Door Closer



Mortise with Dead Lock with Latch



Door Handles



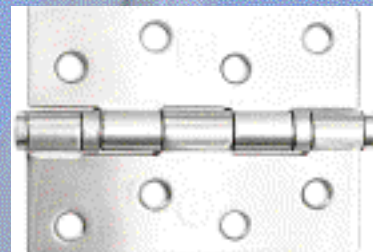
Panic Bar



Cylinder Lock



Door Latch cum Lock



Door Hinge



Cylinder Lock

Ironmongery



Door Closer (Concealed)



Panic Bar (Double Door)



Panic Bar (Handle Type)



Panic Bar (Box Type)



Panic Bar (3 Point Locking)



Panic Bar (Single Point Locking)

Ironmongrey



Door Closer



Door Drop Seal



Panic Bar (3 Point Locking)



Panic Bar (3 Point Locking)



Door Drop Seal



Door Closer



Door Closer

Finishes

Technical Data

Description	Norm	Series 1301	Series 1303	Series 1307	Series 1308
Gloss	EN ISO 2813 (60°)	12 ±5	30 ±5	77 ±7	90 ±10
Finish	Visual	Soft Texture	Smooth	Smooth	Smooth
Adhesion	EN ISO 2409 (2 mm)	Cross-cut rating Gt0 (100% adhesion).			
Impact resistance	ASTM D 2794 (5/8" ball)	More than 23 inch-pounds or 2.5 Nm without film cracking.			
Cupping test	EN ISO 1520	Indentation depth in excess of 5 mm without film cracking.			
Flexibility	EN ISO 1519	Cylindrical Mandrel bending test, passes 5 mm Mandrel diameter.			
Film hardness	EN ISO 2815	Indentation resistance according to Buchholtz: > 80.			
Mortar resistance	ASTM C 207	After 24 hours at specified conditions, mortar is easily removed from the coating resulting neither in loss of adhesion nor in surface marring.			
Drilling, milling and sawing test		No flaking of coating.			
Salt spray resistance	ASTM B 117	No blistering and maximum 1 mm corrosion creep from scratch after 3000 hours.			
Resistance to humid atmospheres containing SO ₂	EN ISO 3231 (0.2 l SO ₂)	No blistering and maximum 1 mm corrosion creep from scratch after 30 cycles.			
Resistance to humid atmospheres	DIN 50017	No blistering and maximum 1 mm corrosion creep from scratch after 3000 hours.			
UV resistance	ASTM G 154 (UVB-313)	Cycle: 4 hours at 50°C UV and 4 hours at 40°C condensation. No chalking, excellent gloss retention and colour stability after 300 hours testing.			
Accelerated weathering test	ASTM G 154 (UVA-340)	Cycle: 8 hours at 60°C UV and 4 hours at 45°C condensation. No chalking, excellent gloss retention and colour stability after 1000 hours testing.			
Natural weathering test	ASTM G 7 (South Florida, 27°N)	No chalking, excellent gloss retention and colour stability after 12 months exposure (angle of 5° to South).			
Surface spread of flame	BS 476 Part 7 - 1987	Class 1			
Fire propagation test	BS 476 Part 6 - 1989	Excellent index of performance.			



Finishes

Chemical Properties at Room Temperature			
	POLYESTER		PE-F
Seawater	Excellent Resistance		
Tapwater	Excellent Resistance		
Distilled water	Excellent Resistance		
Sodium chloride 2%	Excellent Resistance	Petroleum	Excellent Resistance
Sodium chloride 20%	Excellent Resistance	Crude oil	Excellent Resistance
Sulphuric acid 20%	Excellent Resistance	Edible oil	Excellent Resistance
Hydrochloric acid 10%	Little or no Resistance	Refined petrol (gasoline)	Excellent Resistance
Hydrochloric acid, conc.	Excellent Resistance	Terpentine	Excellent Resistance
Nitric acid 3%	Little or no Resistance	High octane petrol	Little or no Resistance
Nitric acid 10%	Little or no Resistance	Toluene	Little or no Resistance
Nitric acid 30%	Limited Resistance	Xylene	Little or no Resistance
Phosphoric acid 4%	Excellent Resistance	Ethyl alcohol 96%	Excellent Resistance
Phosphoric acid 10%	Excellent Resistance	Butanol	Excellent Resistance
Phosphoric acid 43%	Excellent Resistance	Isopropyl alcohol	Excellent Resistance
Sodium hydroxide 5%	Limited Resistance	Glycerol	Excellent Resistance
Sodium hydroxide 30%	Limited Resistance	Cyclohexanone	Limited Resistance
Acetic acid 10%	Excellent Resistance	Acetone	Little or no Resistance
Acetic acid, conc.	Limited Resistance	Methyl - ethyl ketone	Limited Resistance
Na - hyochlorite, dilute	Limited Resistance	Ethyl cetate	Little or no Resistance
Lactic acid 10%	Excellent Resistance	Trichlorethylene	Limited Resistance
Citric acid 10%	Excellent Resistance	Sodium bi - chromate	Excellent Resistance
Ammonia 10%	Limited Resistance	Hydrogen peroxide 3%	Excellent Resistance
Ammonia, conc.	Limited Resistance	Phenol	Excellent Resistance
Sodium carbonate 10%	Excellent Resistance	Urea	Excellent Resistance

Note: The information on this product Data Sheet is given to the best of the manufacturer's knowledge, based on laboratory testing and practical experience. However, as the product is often used under conditions beyond the manufacturer's control, only the quality of the product itself can be guaranteed. Jotun Powder Coating reserves the right without notice to alter or change the contents of this Technical Data.

