RoRo

Side, stern and front doors

Planning the side, stern or front door

Our aim is to design a MacGregor door which is efficient, economic and safe, while fully meeting the specific operating requirements.

The more information that can be given on these prerequisites, the greater the chance to find the optimum solution.

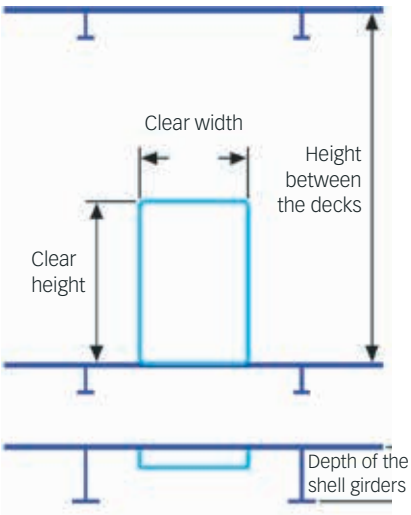
Under the following headings information requirements can found before commencing the project. If these answers are available at the earliest stage possible, work will be saved during the later stages, gaining valuable time by shortening the lead time between initial contact and delivery.

Door type and size

In order to establish the type and size of the door we require information about the purpose of the door and drawings of the ship. Has the ship double hull, a side casing or open web construction? Is the door located in a straight or curved area of the shell?

Are there transverse bulkheads, stairways or other items intruding in the door opening area? Three measurements are vital for the planning:

- the height between the decks
- the depth of the shell girders
- the door clear opening



Loadings

In order to dimension the steel structure we need to know the following:

- the ship's area of operation (shortsea, deepsea etc)
- the vessel speed
- where the door is located (in the front bulkhead, stern, side shell or close to the bow)
- the height above waterline

The steel structure of the door will be designed with equal strength to that of the surrounding plating.

The normal clear opening for the most common door purposes (width x height)

- Doors for bunker stations, 800 x 1 600 mm
- Doors for pilot access, 1 500 x 2 200 mm
- Doors for passenger access, 1 500 to 2 000 x 2 200 mm
- Doors for vehicle access in the side shell, 5 000 x 4 500 mm. These doors can also be equipped to function as combined doors and ramps
- Doors for vehicle access in the deckhouse front, 5 000 to 10 000 x 4 500 mm
- Doors for side loading equipment, 5 000 to 10 000 x 10 000 to 15 000 mm
- Doors for stern access, 5 000 to 25 000 x 4 500 to 6 500 mm

Interface between door and ship

When you design the hull in the area of the door, adequate space must be reserved for the door and its associated equipment.

In most cases the door requires a space of about 150 mm around the perimeter for the rubber packing.

In addition space is needed for both stowing and operation of the door.

The space requirement varies with the different door options indicated in the illustrations on nex page. If you need further assistance during the design, please do not hesitate to contact us.

Top-hinged side shell door

Side-hinged door

Side door

Front door and bulwark visor

Hydraulic capacity

The determing factors in dimensioning the capacity of the hydraulic system are the size of the door, number of sections and the required speed of opening and closing. A typical time for opening or closing a 5 x 5 m door is about a minute, excluding opening and closing of the securing devices. The corresponding time for a pilot door is about 30 seconds. The shorter the time, the more costly the required hydraulics. An indication should be given of the maximum and minimum ambient temperatures in which the hydraulic system is to operate.

Mini Power Pack

To install a mini power pack near a small door instead of connecting the door to a central power pack has some advantages:

- Less hydraulic piping in the ship
- Less piping in sensitive accomodation areas
- Less electric power consumption if the door need to be opened at sea (e.g. pilot door).

The mini power pack is complete, consisting of a tank, electric driven hydraulic pump, operating valves, and a hand pump for emergency operation.

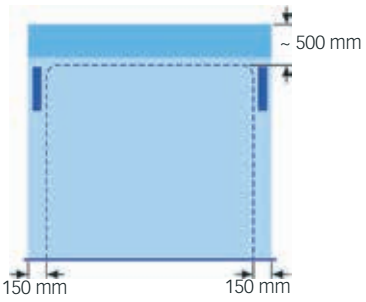
Regulatory bodies

Please specify which demands are to be met by the equipment. In other words, which classification societies, national authorities and other regulations (e.g. IMO) are to be satisfied. The door is always classified as part of the side shell or deckhouse front of the ship.

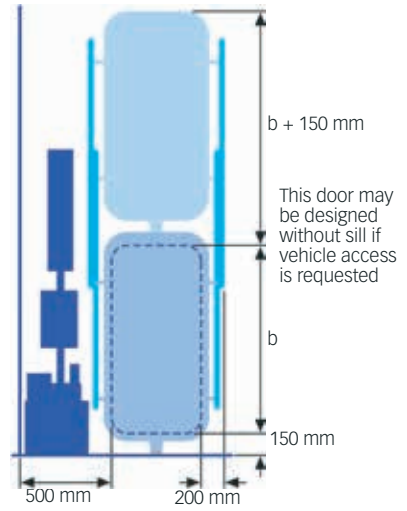
Options

On the right page, we show the equipment or accessories which require your decision, also optional equipment which may be added to the door. These should

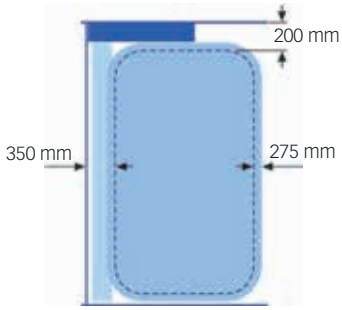
Reserve space for associated door equipment.
Several of the doors can be electrically operated.



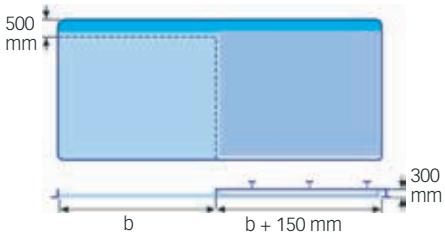
Top-hinged door



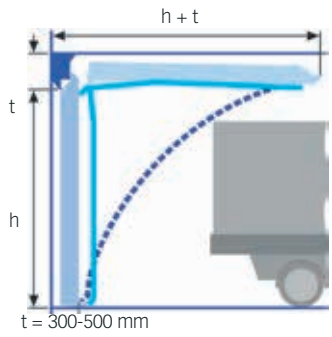
Vertically sliding door



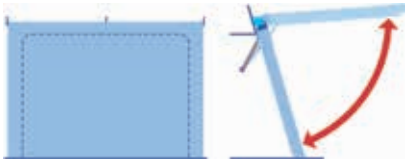
Side-hinged door



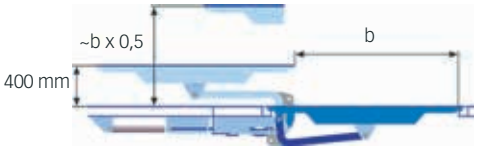
Horizontally sliding door



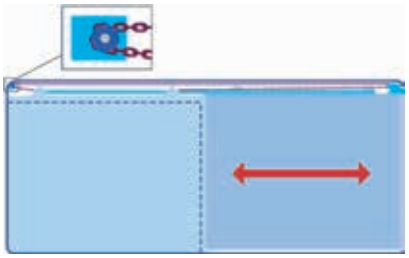
Inboard vertically sliding door with horizontal stowage



Top hinged door operated by direct hydraulic cylinders



Swing-arm type (outboard only)



Horizontally sliding door operated by hydraulic motor and chain

Horizontal sliding stern door.

Rampway door

Front door (view from inside ship).

be studied point by point when making an initial evaluation, based upon the particular operating conditions.

MacGregor door opening options

You can choose between outboard or inboard opening direction for all types of doors, except for the swing-arm type, which is opened only in the outboard direction.

The pilot access door must be opened inboard. This is required by the International Pilot Association to ensure safe pilot embarkation.

The passenger access door is also usually opened inboard, otherwise it would encroach in the passenger gangway area onshore.

Doors larger than 12m^2, e.g. access doors for trailers, are normally opened outboard because it is regarded as a safer solution by the classification societies.

If you still request inboard opening, the door must be reinforced by extra strong back beams, or similar devices, to avoid the pressure from the sea being transmitted to the cleating system.

Operating options

The operating options vary with every type of door according to the list.

- direct-acting hydraulic cylinders
- wires operated by jigger-winches
- hydraulic motor and chain
- hydraulic motor with rack and pinion drive
- electric drive operation

For hinged and swingarm-type doors, hydraulic cylinders acting directly on the door work most effectively. When operating horizontal sliding doors, the optimum solution is a hydraulically-operated motor and chain system. An effective alternative is a hydraulically-driven rack and pinion drive configuration. Vertical sliding doors are best operated by wire ropes anchored in the door with a hydraulic jigger-winch mounted at the deck-head beside the door.

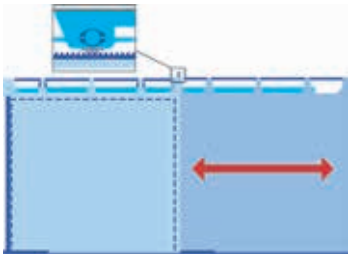
All of the above hydraulic operating options can be exchanged for electrically-driven solutions.

Control options

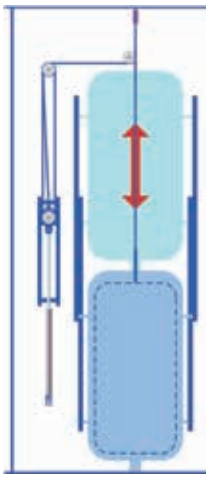
Two different systems are available; manual, where each step in the operation is controlled by hand operated hydraulic valves, or automated (whereby the touch of a single button will initiate and complete the whole opening or closing sequence).

The greater the degree of automation of the system, the easier and faster the operation.

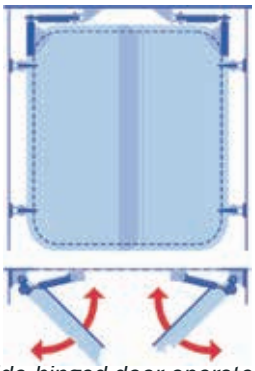
An automated system will be particularly cost effective on shorter runs where there is a need for fast loading and unloading.



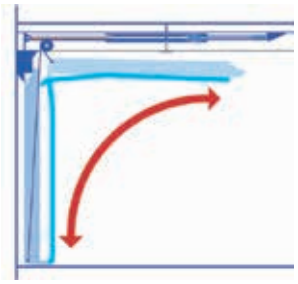
Horizontally sliding door operated by hydraulic motor with rack and pinion drive



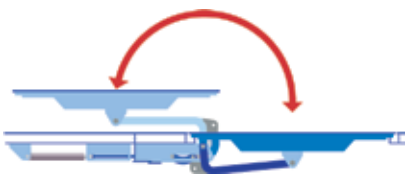
Vertically sliding door operated by jigger-winch and wire ropes



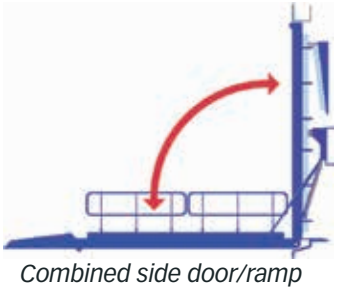
Side-hinged door operated by direct hydraulic cylinders



Inboard vertically sliding door with horizontal stowage operated by jigger-winch and wire ropes



Swing-arm type door operated by direct hydraulic cylinders



Combined side door/ramp

Ramp option

The shell door can be equipped to function as a combined side door/ramp.

This solution is normally used in combination with shore ramps that are adjustable in height, or for vessels that will sail in waters with a minimum of tide. It is important that the threshold of the combined door/ramp is always above the quay level.

Further information is available in the datasheet *Straight stern ramps.*

The MacGregor standard for side, stern and front doors

Over the years MacGregor has designed and manufactured a great variety of side, stern and front doors for different types of ships. We therefore promise that your door will meet your needs in terms of quality, efficiency, security and overall economy. Yet it will be standardised in all major functions.

In other words, you will be supplied with well-proven equipment which is easy to repair in the event of an accident and easy to maintain for long-term trouble-free operation. We believe in high quality in every respect.

Steel structure quality

The door is designed as a flat top plate with an open web construction. High tensile steel is used throughout the door as standard.

Open web construction

Quality of fittings

Shafts and pins exposed to the weather are of stainless steel. Cylinders are fitted with spherical bearings.

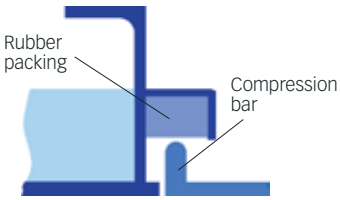
Sealing and securing quality

The team of MacGregor engineers have developed an efficient and secure watertight seal. The result is a simple but high-performance design. A rubber packing is placed in and around the perimeter of the opening of the hull.

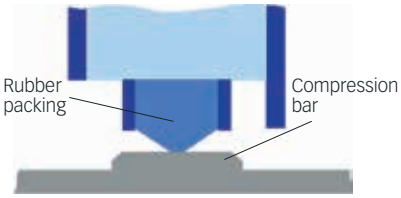
The rubber packing is pressed against compression bars made of stainless steel. These have a very smooth surface to protect against any ingress of water.

The door is secured in the closed watertight position by hydraulically operated bolts cleats, finger cleats and cleat mechanism. They are well-proven MacGregor innovations which can be relied upon.

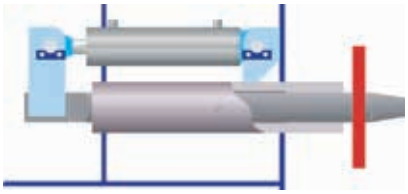
There are two types of seal design as standard. When the door must be without sill, mostly for vehicle access, a sliding packing design will be utilised, which also allows relatively large racking deflection of the opening. In all other cases the conventional design is used.



Conventional seal design

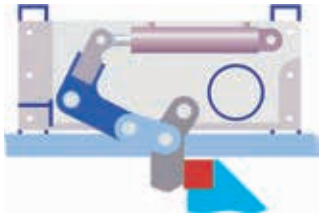


Sliding seal design



Bolt cleat for top-hinged doors

Finger cleat for side-hinged and swing-arm doors



Cleat mechanism for sliding doors

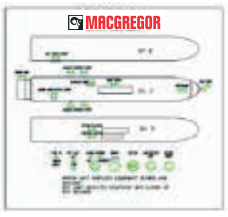
Safety quality

Being the market leader, MacGregor's ship experts are invited by national authorities and classification societies to use its expertise and experience, gained from numerous installations, to help develop and evaluate new rules and regulations.

Your door will incorporate a number of items of safety equipment regulated by classification societies and authorities. When the door is closed and cleated, the true status is confirmed by the indicator lamps both at the operating panel and the bridge panel.

In the case of hydraulic operation, custom designed load control valves are normally fitted directly on the cylinders. This will prevent the door from uncontrolled movements in the event of hydraulic or electrical failure.

Only high quality components, from approved suppliers, for marine environment are used in MacGregor equipment.



Bridge panel

ISO9001 • ISO14001
OHSAS 18001
UKAS MANAGEMENT SYSTEMS
001

Lloyd's Register Quality Assurance certifies that the Quality Management System for MacGregor is ISO 9001:2008 compliant.

MacGregor *is the world's leading brand of engineering solutions and services for handling marine cargoes and offshore loads. MacGregor products serve the maritime transportation, offshore and naval logistics markets, in ports and terminals as well as on board ships. Our cargo flow solutions integrate cargo access, stowage, care and handling functions to suit a particular ship's cargo profile. This benefits its productivity, environmental impact and profitable service lifetime.*

MacGregor is part of Cargotec. Cargotec's class B shared are quoted on NASDAQ OMX Helsinki.

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