How to implement rapid roll doors

Many warehouse, factory and garage buildings have large doorways fitted with roller shutter doors. These doors tend to get left open in busy periods because they're a hassle to use.

The answer is simple – roller doors that are fast to open and close, making access quick and convenient. With doors closed more often, companies could save as much as 20% of the energy used for heating or cooling their buildings.

There are added benefits too, as rapid roll doors can improve security in covered garages, commercial buildings, factories, depots and public buildings.

The business case

The size of the door, the number of hours it's usually left open, the temperature and the cost of energy are all factors in estimating the savings you could make.

Costs for rapid roll doors vary widely, so you should get three or more quotes from suppliers and installers. As a rough guide, though, with a doorway area of 20m^2 and a door height of 5m, the basic cost of the door would be around £8,800. This could increase to around £10,000 with extras. See the specifications checklist for an idea of what these could include.

If the old door had been left open for 30 hours a week and the new rapid roll is left open for five hours, you could save 51,400kWh a year, giving an annual saving of £1,540[1]. You would recoup your costs in around six years.

The technology

Rapid roll doors are designed to take advantage of automatic detection systems and switches so that they can be opened and closed with very little bother to the user or operator. The door blade is made from a flexible material so that the door can be opened and closed quickly. 'See *Table 1* for types of rapid roll door controls.'

Applications

Rapid roll doors are used in warehouses, garages, factories, commercial properties, freight depots, bus and train depots and some public sector buildings, such as fire brigade buildings. They can be used inside buildings as well as outside.

Two doors can be installed in series and used as an air lock to isolate different environments.

Roll doors are made in various sizes – from small pedestrian and pallet truck access to large access doors up to 6m high by 6m wide.

The doors are usually designed to open vertically upwards, but it also possible to have doors that open from the centre or side.

[1] Based on an average outside temperature of 7°C, average inside temperature of 17°C, 20 weeks' space heating a year and gas at 3p/kWh.

Table 1 Types of rapid roll door controls

Method	Description
Standard push button and pull cord	Basic, manually operated system to open and close door. Does not take full advantage of rapid roll door benefits.
Standard automatic timed closure (variable)	A manually operated switch to open the door. A programmable countdown timer closes the door once it has been left open for a predetermined length of time. This automatic closing method is used with all the automatic systems listed below.
Remote control operation (unlimited number of handsets)	The user or operator uses a remote switch to open and close the door. The handset sends a signal to the door controller to open the door. This has safety and security benefits because access is restricted to users with handsets.
Magnetic induction loop	An induction loop, usually installed in the floor next to the door. If a metallic, capacitive or conductive object enters the reception area, this modifies the induction loop signal and the control system activates the door opening mechanism. The door closes after detecting no object in the reception area for a predetermined length of time.
Motion detector	An electronic device that detects movement within a certain area and activates the door. The door closes after detecting no movement for a predetermined length of time.
Infrared photo cell	A similar method to the motion detector, typically using an infrared beam. When the beam is broken, the door is activated.
Programmable logic controller (PLC)	Door opening times are controlled using a computer programme based on various parameters, such as time of day, production activities and so on.
Load cell activation	The door is activated by the weight on a load cell embedded in the floor. This means vehicles can open the door by driving over the load cell, but pedestrians can't. The door closes after detecting no weight on the load cell for a predetermined length of time. This is an expensive method of activating the door opening mechanism, as groundwork is needed to install the load cell sensors. It is likely to add several thousand pounds to the cost.

Specification checklist

The design and functions of rapid roll doors vary depending on the application, so you should discuss the details listed in Table 1 with your contractor.

You may also need to consider health, safety, hygiene and specific operation requirements. For pharmaceutical and food factories, for example, doors need to be made from materials that can be easily cleaned and disinfected.

Ensure that your initial specification and order include all the items you need. Things that can easily be overlooked include the installation of bollards, signposts and warnings. You may also need to install a pedestrian door at the side of the rapid roll door.

Table 2 below lists the things to consider when specifying rapid roll doors.

Table 2 Specification checklist

Method	Description
Application	A description of what the door is used for, type of traffic, operating hours, type of environment (temperatures, pressures, hygiene, safety and other issues).
Frequency of use	Number of times a day the door is likely to be opened and closed.
Dimensions	Include the maximum clearance needed for the various types of traffic that will use the doorway.
Design attributes	For safety reasons, closing **speeds** tend to be slower than the opening speed. Typically the closing speed is from 0.1m/s to 0.8m/s. Opening speeds tend to no more than 3m/s.
	Draught sealing on the vertical guide channels use brush or rubber strips either side of the joint between the door blade and the frame. The most popular draught seal is rubber as it can be cleaned more easily.
	Door blade material – such as polyester, PVC in sheet, fabric or composite form. Some more expensive doors are made from insulated double-layered aluminium slats. Discuss the options and cost with your contractor. If the door and its components are made from good quality materials and it is installed correctly, you should avoid any problems with reliability.
	Flexible flap at the bottom of the door blade to provide a good seal with an uneven floor surface.
	Metal ribs attached to the door blade fabric and running horizontally across the door blade to increase strength and prevent wind damage.
	Metal crash pole running across the front of the door.
	Anti-static coating to reduce friction created by the fast opening action – to prevent build-up of dust and possible sparking.
Open and close method	• Standard push button
	• Pull cord
	• Standard automatic timed closure (variable)
	• Remote control operation (unlimited number of handsets)
	• Magnetic induction loop
	• Motion detector
	• Infrared photo cell
	• PLC controller
	• Load cell activation
Health, safety and hygiene	**Essentials:**
	• Emergency manual opening system
	• Pedestrian warning signs
	• Visual and audible signals when the door is about to open or close.

Table 2 Specification checklist (continued)

Method	Description
Health, safety and hygiene (continued)	Recommended:
	• Vision panels made from transparent materials (strongly recommended)
	• Fail open system
	• Stop and return to fully open on contact with a solid object
	• Low voltage wiring (24VAC) except for the motor
	• Door blade material made from or coated with flame retardant to ISO34A (BS 5438)
	• Foam packed safety buffers
	• Posts and bollards around the doorway to protect the building, door and pedestrians.
	Options:
	• Door blade coated with fungal growth inhibitor
	• Dust protection system around the edges of the door
	• Vermin and bird seals
	• Stainless steel for food and pharmaceutical operations.

Commissioning checklist

Your supplier or installer should commission the new door and demonstrate that it works correctly.

Common problems

Habits die hard and some users may still be tempted to leave the door open. Watch out for users pressing the emergency stop button to permanently fix the door in its fully open position. Another method to be alert for is people leaving a loaded pallet on the load cell or in the detection zone. This will obviously waste energy and the money you've invested in the rapid roll doors.

Finding a supplier

It's advisable to choose a supplier and installer who:

- is approved or registered with a recognised association
- can show you evidence of previous work and references
- is happy to agree with you in advance the type of materials and components to be used
- can give you a firm schedule and itemised cost
- is insured against all liabilities
- can provide a warranty for the work.

The following organisations can give you details of qualified suppliers.

The Door and Hardware Federation
01827 52337
www.dhfonline.org.uk

The Confederation of Construction Specialists
www.constructionspecialists.org

BRE (Red Book)
01923 664100
www.brecertification.co.uk