

Ensuring compliance in door opening forces

As a designer and manufacturer of door closers, you might think that we'd be only concerned about the forces required to close a door. But the force applied to close a door corresponds directly to the force required to open that door. And that's an important topic.



Why the focus on door opening forces?

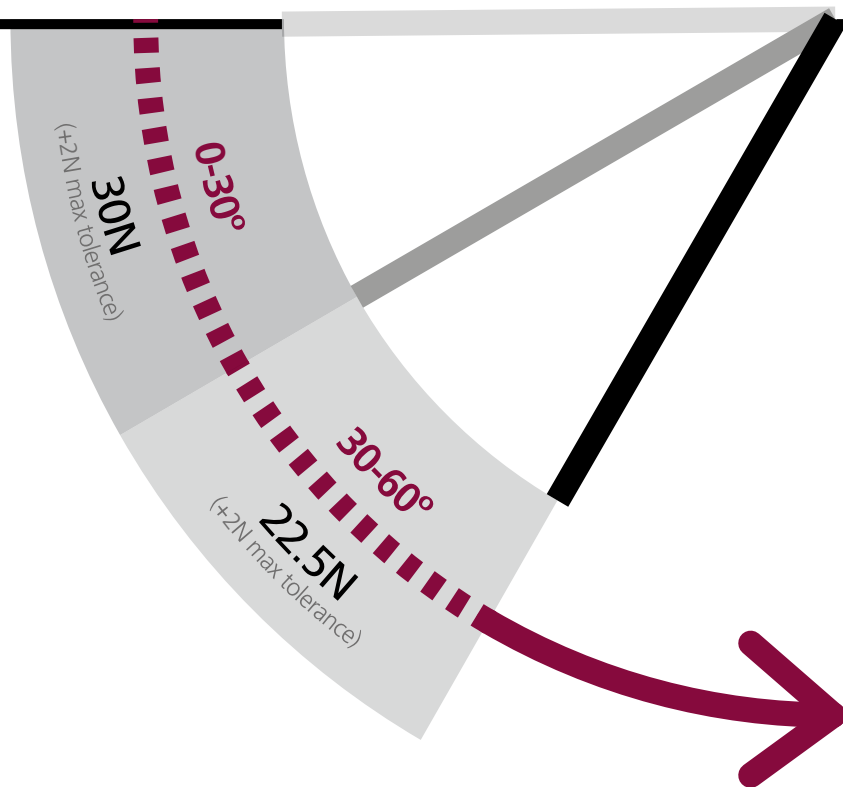
The UK government first introduced the Disability Discrimination Act in 1995 to prevent discrimination against those that are less able. Since then, legislation has continued to evolve in the Equality Act, with the intention of ensuring that public and corporate spaces are accessible to all.

Door opening forces form a critical part of ensuring universal accessibility, as the effort required to open a door can be an immediate accessibility barrier to someone with physical impairment. For this reason, it is legislated for within government guidance. Maintaining reasonable ease of door opening is essential to ensure that wheelchair users, those with walking aids, and those with reduced upper-body strength can still access facilities easily and without undue stress and pressure.

As with many parts of law, what has been legislated is simply the reasonable care and consideration of our fellow beings. It's as much about doing what's right as doing what's legal.



BS 8300: Door opening forces



What do the regulations state?

British standard BS 8300-2:2018, in tandem with Doc M, provides practical guidance on how to meet the minimum standards required to comply with the Equality Act.

The guidance in BS 8300 indicates the following in relation to permissible door opening forces:

- + Opening a door from 0 to 30 degrees (from the closed-door position), a maximum of 30N pressure shall be required.
- + From 30 to 60 degrees, the maximum force required shall be 22.5N.
- + The measurements shall be taken at the leading edge of a door. However, where this not possible, they may be taken up to 60mm in from the edge and approximately in line vertically with the centre line of the door handle, and an additional 2N is permissible when measuring this way.
- + A tolerance of 2-3N is acceptable on all readings. Therefore, total maximum force allowed for under BS 8300 is 35N (0-30°) and 27.5N (30-60°).

BS EN 1154 covers the expectations relating to door closing, relative to achieving required safety on fire doors. It states that the self-closing device on a fire door (required by Building Regulations Document B) must give a minimum closing force of 18Nm, and sufficient to close the door fully against whatever latch (or other) resistance that exists.

The requirements of the two pieces of legislation set up competing demands to achieve accessibility for all as well as full-time fire safety. Both are vital objectives, however, and it is important that both are met.



How are door opening/closing forces measured?

In simple terms, door opening and closing forces are measured with a force gauge, of one sort or another. For accurate measurements, an electronic force gauge is recommended, and these can be fitted with different attachments to measure push or pull force. Routine calibration is required to ensure that measurements remain accurate.

For door opening forces, the measurement should be taken at the leading edge wherever possible. The Rutland technical team will often achieve this by attaching a short strap to the door handle on the outward side of a door, pulling it round the leading edge to the opening side of the door, and then attaching the force gauge to the strap to pull the door open and measure the force required to do so.

The push force reading can be taken by simply applying the push pad of the gauge to the leading edge of the door and opening the door steadily to measure the force required.

Measurement of door closing forces are measured by applying the gauge to the outward face of the door and moving back in time with the door as it closes. As door closing requirements are set in Nm, the N force reading must then be multiplied by the distance away from the hinge side of the door at which the force gauge was applied, to arrive at a Nm reading. (E.g. force reading 25N x distance from hinge edge 0.75m = 18.75Nm.)

In all measurements, the door should be opened or closed at the rate of one degree per second, to ensure accurate readings that are not overstated by the acceleration force required to open a door fast or the momentum build-up of a door closing.



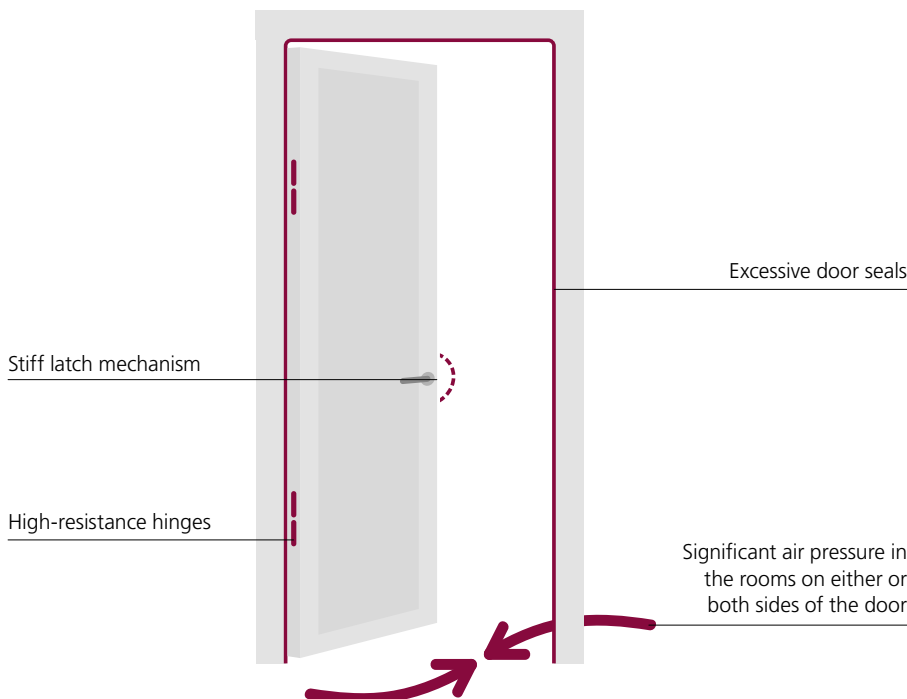
Who ensures compliance with BS 8300?

At initial sign-off of any new building, inspectors from Building Control will ensure compliance with legislation covering door opening and closing forces, and they will require both BS 8300 and BS EN 1154 to be met, especially in buildings where a broad mix of users is likely.

Thereafter, fire door inspectors are the most likely to assess the opening and closing forces as part of fire safety checks, but they are understandably more likely to focus on the closing forces required to fulfil fire safety.

Ongoing attention to compliance with the requirements relating to door opening forces largely rests with facilities management within any organisation. It is important that attention is paid to this to ensure that all visitors to a building are granted equal access and to prevent organisations facing claims of discrimination.

Some typical saboteurs of BS 8300 compliance



Are opening and closing forces all down to the door closers?

Clearly a door closer is at the heart of door opening and closing forces. Selection of the right closer is crucial to achieving forces that are compliant with legislation. It should be selected based on the width and weight of the door, and it will need adjusting on site to ensure that the correct forces are applied to always close the door while maintaining sufficient ease of opening. The operational efficiency of the closer is important, and not all door closers are of sufficient quality to achieve compliance in challenging situations.

It has been known for force testing to be deliberately manipulated to achieve 'compliant readings' by adjusting the door closer to different power settings between measuring the opening force and the closing force. This is obviously not acceptable – the requirements of both sets of legislation must be met at the same time for a door to be truly compliant.

But the door closer cannot necessarily achieve compliance on its own. Several other factors have significant impact on the force required to close or open a door, and without attention to these, it can be impossible to comply with both BS 8300 and EN BS 1154.

These additional factors include, but are not limited to: the latch, hinges and any seals applied to the door set, and the air pressure in the spaces that the door separates.

Get in touch:

Our technical team at Rutland is always available to advise on specific project requirements or to help solve particular challenges you may face with fire door adjustments. Simply give us a call on 01246 261491.

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Tips for achieving door opening/closing compliance

Air pressure

In indoor areas which are tightly sealed, air pressures can create significant resistance to a door closing, which requires the door closer to be adjusted to a high-power level. This can then raise the force required to open the door beyond acceptable levels. A power-adjustable closer is essential, to enable the force to be taken to the maximum permissible level, but there are other things that can be done to address air pressures. Intumescent air-transfer grids or balanced dampers can be installed in the air-locked rooms to allow air to escape when doors are closing. In the event of fire, the intumescent expands to close the vents and maintains required fire containment.

Door seals

With the justifiable focus on fire safety, door seals are universally applied to fire doors. However, over-specifying the seals applied to doors can then create significant resistance to a door closing, which again requires a high-power door closer to overcome that resistance. This, in turn, raises opening forces to unacceptable levels. The solution is to ensure that door seals are applied at recommended levels to achieve compliance, but not beyond, which prevents unnecessary closing resistance.

Door hinges

In simple terms, poor quality door hinges can create resistance to closing and/or add pressure to door opening. This can be overcome by ensuring that good quality hinges with low-friction washers are used.

Door latch

A poor quality or badly adjusted door latch can make the final stage of closing difficult and require that phase of the door closer's action to be adjusted to high power. As this translates directly into extra force required for the initial stage of opening (the most challenging part for those with physical impairment), it is an important aspect to focus on when procuring door sets, and when setting up on site.

Piecing the puzzle together

In conclusion, we would emphasize that there is more to successful set-up of a compliant fire door than meets the eye. However, with the advice contained in this whitepaper, it is possible to balance the range of dynamics and achieve compliance with both BS 8300 and BS EN 1154 – making a building accessible for all but maintaining crucial fire safety.