

Revised versions of EN 12453 and EN 12604

INTRODUCTION

Revised versions of the original BS EN 12453:2001 and BS EN 12604:2000 have now been published. In response HSE have issued a warning notice to industry highlighting the lack of harmonisation with the Machinery Directive. This means that despite the revision process that has been running since the European Commission effectively removed the harmonisation status of these standards when it de-listed and issued a warning in regard to BS EN 13241 in July 2015, the revised standards do not alleviate the harmonisation problem and they still cannot be used to confer Machinery Directive compliance.

The HSE warning (also attached) can be located here: [\[link to warning document\]](#)

In response, DHF are issuing this guidance on the main changes and associated problems to provide help in dealing with the issues presented by these revised standards.

BS EN 12453:2017 – Safety in use of power operated doors, gates & traffic barriers

BS EN 12453:2017 combines the old BS EN 12453 and BS EN 12445 standards into a single document covering both the requirements and the necessary test methods to verify compliance. Although it was intended that this standard would replace the current BS EN 13241 as the Machinery Directive harmonised standard it is currently not listed in the EC Official Journal and hence is not in fact harmonised, regardless of the fact that it contains an Annex ZA to that effect.

The UK version of the standard is published with the following national foreword for this reason.

National foreword

This British Standard is the UK implementation of EN 12453:2017.

It supersedes BS EN 12445:2001 and BS EN 12453:2001, which are withdrawn.

BSI, as a member of CEN, is obliged to publish EN 12453:2017 as a British Standard. However, attention is drawn to the fact that during its development the UK committee voted against its approval as a European Standard.

The UK committee has the following concerns regarding EN 12453:2017:

- a) Hazards from other surfaces such as the ground and by reverse movement, which may be initiated by the door control mechanism in response to safety activation, are not explicitly recognised.*
- b) Clause 5.5.4 does not, for vertically moving doors, require the drive to be switched off in the event an anti-drop or other device like slack wire being activated.*
- c) Clause 7, in the opinion of the UK committee, is inadequate in the absence of EN 12635, Industrial, commercial and garage doors and gates - Installation and use, and its predecessor EN 12635:2002+A1:2008, which now has a warning in the Official Journal of the European Union.*
- d) Annex C, which supports the requirements of clause 5.2.1.6 on limitation of forces, including the impact hazard of clause 5.2.3 (both via Annex A) requires 'measurements between the main closing edge and the opposing closing edge, or between two main closing edges', but does not seek to interpret the results in relation to other points protected by force limitation that are not, or cannot, be tested directly e.g. the hinge area and under door/gate crush and impact hazards in the movement area.*

e) *Neither clause 5.5.4 or Annex E caters for failure of a gear in the suspension system of vertically operating doors unless the system includes dual drives, as many unbalanced rolling doors are suspended purely by a single drive unit transmission, any internal failure of the transmission could result in catastrophic uncontrolled movement unless it is protected by an anti-drop device.*

Due to these concerns, the UK committee therefore advises that users of BS EN 12453:2017 should not rely solely on compliance with this, and the normatively related standard BS EN 12635, for the safety of products within scope of this standard.

This standard is not listed in the Official Journal of the European as harmonised under the Machinery Directive 2006/42/EC and therefore does not confer any presumption of conformity to the Machinery Directive 2006/42/EC.

For information on the relationship between this standard and EU Directive(s), the UK committee draws users' attention to the warnings in Annex ZA.

Please note that this foreword does not appear in the Republic of Ireland version (IS EN 12453:2017), although the lack of MD harmonisation does of course apply.

The publication of this standard, following the loss of harmonisation of its predecessors in 2015, via reference from EN 13241, does mark a change in the “state of the art” in terms of MD compliance. Hence there is now an identifiable change in the requirements of pre and post 2018 manufactured systems. Due to the impact of the previous loss of harmonisation the impact on the assessment existing systems will be fairly insignificant as many of the improvements listed in the new standard will need to apply to older systems to ensure their safety.

Major repairs and upgrades of existing systems should in any case be competed to comply with the new standard, taking account of the remaining deficiencies that are blocking BS EN 12453:2017 harmonisation.

The main changes are outlined below, along with a DHF comment.

5.1.2. Control system

(Applies to automated systems installed post 2018)

The minimum performance for safety related parts of the control system is now EN ISO 13849-1 minimum PL C category 2 from the sensing unit (eg safe edge) to the output switching device (eg motor terminals), including the connection between the sensing unit and the control panel.

This applies to:

- Limit switches
- Hold to run devices
- Safe edges, light grids and laser scanners

The 2017 standard extends this requirement to stop switches of wicket doors and fall-back protection devices.

The clause can be disregarded where the safety related parts of the control system conform to EN 60335-2-95 or EN 60335-2-103.

DHF comment.

As category 2 is not actually possible for static stop switches, we advise achieving the PL C but disregarding the category 2 element; essentially, use high integrity switches and cabling with a sufficient mean time to failure.

Confusingly allowing the 60335 caveat essentially reverts to the old EN 954-1 category 2 requirement (see below) - negating the new clause!!

The old EN 12453:2001 requirement was for a minimum of EN 954-1 category 2 for safe edges, light grids and laser scanners but not limit switches or hold to run switches. Although not explicit, this always did include the connection between the safety device and the control panel, it is now made more explicit. This will be particularly challenging for many category 3 devices.

In particular, when using category 3 components they will now need to achieve PL C category 3 across the interconnecting wires between device and panel, this will mean that the old undetected short circuit fault potential in a normally closed circuit cannot any longer be tolerated, unless it prevents further use at the end of that cycle, in which case the combination may actually achieve an overall category 2 status.

Although the new clause 5.1.2. is mainly aimed at control panel/motor manufacturers, installation and maintenance companies will need to take particular care when selecting panels, motors, safety devices and hold-to-run switches to ensure that their chosen combinations will meet the new requirement.

Due to the confusion the new clause 5.1.2. brings, our advice is to ensure that the requirements in DHF TS 011/012 are achieved until such time as manufacturers can catch up with the new requirements and further clarification is received from the appropriate CEN committee.

5.2.1.8. Supplementary device to reduce the probability of contact

(Applies to automated systems installed post 2018)

If a supplementary device to reduce the probability of contact is required, and if the distance a between the supplementary device and the opposite edge of the door leaf is equal or greater than 150 mm such a device is needed at both sides of a sliding door and vertically moving non-protruding door (see below).



DHF comment.

DHF TS 011 (gates and barriers) has long recommended the second beam, it is now mandatory under the above conditions for vertically moving/sliding doors and gates. The requirements for when supplementary devices are required have not changed; when auto close is in use, and when un trained users might be present (most systems).

6.2.2. Crush and shear (and hence draw-in) at the supports of horizontally moving doors/gates

(Applies to pre and post 2018 automated systems as this is a known and very real hazard not properly covered by the old standard, leading to the withdrawal of harmonisation)

The use of a rigid 120mm x 120mm x 500mm rectangular test piece to verify that the placement of safe edges (or optical devices) will not allow inadvertent draw in, missing contact with the safe edge.

DHF comment:

DHF have long adopted this measure in the relevant TS 011/012, since publication.

Annex C - Force measurement

(Applies to pre and post 2018 automated systems as this presents a well-known and very real hazard not properly covered by the 2001 standard)

The inclusion of a 1500mm test to include the full speed range of movement where slowdown is used to achieve safe force in the final 500mm of movement of horizontally moving doors/gates, and the exclusion of the 300mm tests for horizontally moving doors and gates.

DHF comment.

DHF have long adopted these measures in the relevant TS 011/012, since publication.

The new standard is still not clear about verifying safe force at many hazards in the movement area of horizontally moving doors/gates. Although clause 5.2 acknowledges the use of force limitation to control various crush, shear and impact hazards, Annex C does not explain how to verify these areas.

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To address this DHF TS 011/012 provides a practical solution.

1. Swing and folding gates/doors

- a) Where the same size safe edge is installed on the leading edge and the offending lower edges or hinge area, the results of the full speed test at the leading edge can accurately verify safe force at all other protected areas because safe edges have been proven to completely counter the effects of reducing speed/increasing torque across the swept area toward the hinge.
- b) Where inherent force limitation is used to provide safe force at the leading edge most inherent systems will balance the reducing speed/increasing torque in the outer 2/3 of leaf width but rarely in the last 1/3 towards the hinge, these areas will invariably need safe edges.

These safe edges can be either tested directly against a suitable rigid structure (eg wall or fence) with a suitable extension on the tester to reach full speed travel.

Failing that, where a force tester cannot be accurately placed or inserted (eg in the hinge area), as the speed of movement is so low in the final 1/3 of leaf width verification of safe edges in these areas can be adequately checked by sample checks with off cuts of 38mm plastic sink waste pipe, looking for distortion (crush) of the pipe as an indication of failure.

2. Sliding door/gate support area crush, shear & draw-in hazard safe edges

- a) Where the same size safe edge is installed on the leading edge and at the offending support hazards, the results of the full speed test at the leading edge can accurately verify safety at these areas.

Be aware though, although an impact force of 1400N is acceptable outside of the final 500mm of movement at the leading edge, the crush, shear or draw-in hazards at the supports will need to be below 400N, hence the 1400N figure must be disregarded and less than 400N achieved at full speed at the leading edge to verify safety at the supports.

- b) Where differing size safe edges are used (not to be recommended) verification of the safe edges at the supports can be verified by testing a sample of the support area safe edge profile temporarily mounted on the leading edge. Alternatively, where data tables are available for both safe edge profiles, providing the leading-edge full speed test achieves less than 400N; if the support area safe edge has comparable actuation pressures and equal or greater overtravel it can be assumed the support area safe edges are safe.

For field testing of individual doors/gates/barriers, DHF specifies far fewer tests than either the new 2017 or the old 2001 standard, this is because the tests in the standards are intended as a type test prior to serial manufacture rather than a one-off site test. DHF test requirements do however specify far more rigorous assessment of the results, as outlined above, to counter the harmonisation problems with the old and new standards.

Annex D – Testing presence detection used without force limitation

(Applies to automated systems installed post 2018)

When testing vertically acting door light grids installed in the guides, the old 2001 standard test method allowed wider spacing of the beams above 300mm than below 300mm as test piece B was only specified for use below 300mm. The new test method now requires the use of the B test piece at all points between ground and 2.5m. This will mean that the light grid must now have uniform beam spacings of less than 50mm.

Note, test piece B is a rigid cylinder measuring 50mm x 300mm as with the 2001 standard.

Test piece B is also now specified for testing all crush, shear and draw-in hazards on horizontally moving doors/gates between ground and 2.5m, the old standard only required tests with the A test piece at ground level.

Note, test piece A is a rigid rectangular box measuring 200mm x 300mm x 700mm as with the 2001 standard.

DHF comment.

For field tests of individual doors, gates and barriers DHF specifies that the test pieces are finished in matt grey and matt black as recommended by ADSA for field testing of automatic pedestrian doors, as opposed the very fragile finishes specified in the new standard, see DHF TS 011/012.

5.5.4. – Uncontrolled movement of vertically acting doors

(Applies to post 2018 systems, pre-2018 systems were covered the old 2000 standard)

It would appear that under EN 12453:2017, protection against fall back of vertically acting doors due to transmission failure (unless there are two drive units fitted) is no longer required as the old EN 12604 used to specify protecting spring, chain, strap, cable or gear, whilst the new standard by referencing EN 12604:2017, no longer specifically refers to gear failure. In theory this could mean for example that a tube motor operated un-balanced shutter will no longer need a safety brake!

DHF comment.

DHF does not believe that this is an intended outcome and still require that such doors are fitted with a suitable safety brake, we will continue to lobby the appropriate CEN committee to resolve or clarify this point. DHF TS 012 provides adequate protection in this regard.

Annex E – Safeguarding against dropping by other design features incorporated in the suspension system of vertically moving power operated door leaves

(Applies to automated systems installed post 2018)

It would appear that under EN 12453:2017, where fall back protection is provided by technical design means (eg counter balance spring and direct drive combinations), unless there are two drive units fitted there is no requirement for prevention of further use.

DHF comment.

As with the old standard, where fall back protection is provided by technical design means (eg counter balance spring and direct drive combinations) there is no requirement for prevention of further use.

Following the Guildford G-Live deaths and subsequent prosecution, it has become obvious that preventing further use following balancing system component failure (even though fall back is prevented) is critical as continued use could become catastrophic if the drive then suffers a subsequent failure, particularly as it will now be under severely increased load. Where a system prevents fall back but does not prevent further use, DHF recommends raising the issue as “requiring improvement” with the client and advises that new systems should prevent further use following any failure of spring, chain, strap, cable or gear.

Again, we will work with the appropriate CEN committee to resolve or clarify this point. The newly revised DHF safety warning notice 4 contains workable guidance in the meantime.

BS EN 12604:2017 – Mechanical aspects of doors, gates & traffic barriers

A revised version of the original BS EN 12604:2000 has now been published.

BS EN 12604:2017 combines the old BS EN 12604 and BS EN 12605 standards into a single document covering both the requirements and necessary test methods to verify compliance. The new standard is primarily targeted at manual doors, gates and barriers, whereas the old versions covered the mechanical aspects of all systems. Although not harmonised itself, it is referenced in various clauses of BS EN 12453:2017 and hence has significance for the safety and hence compliance of automated systems.

The UK version of the standard is published with the following national foreword for this reason.

National foreword

This British Standard is the UK implementation of EN 12604:2017. It supersedes BS EN 12604:2000 and BS EN 12605:2000, which are withdrawn.

BSI, as a member of CEN, is obliged to publish EN 12604:2017 as a British Standard. However, attention is drawn to the fact that during its development the UK committee voted against its approval as a European Standard.

The UK committee submitted a negative vote for the following reasons:

- a) Clause 4.7 does not include requirements providing for and maintaining chain and sprocket, and rope and/or strap and pulley alignment where necessary to prevent wear and premature failure.*
- b) EN 12604:2017 is normatively referenced by EN 12453:2017, which the UK also submitted a negative vote for. The reasons for this are explained in the National Foreword to BS EN 12453:2017.*

Attention is drawn to Essential Health and Safety Requirement 1.3.9 “Risks of uncontrolled movement” from part 1 of schedule 2 of the Supply of Machinery (Safety) Regulations 2008, which requires that measures to prevent or avoid hazards for uncontrolled movements by machinery in scope of the Machinery Directive 2006/42/EC (which EN 12453 covers).

Please note that this foreword does not appear in the Republic of Ireland version (IS EN 12604:2017), although the lack of MD harmonisation still applies.

The new 2017 version of this standard differs from the old 12604 in that it is targeted specifically at manual doors, gates and barriers. Confusingly however, many of the clauses in EN 12453:2017 reference clauses in EN 12604:2017, as a result, users of EN 12453:2017 will still need a copy of EN 12604:2017.

The main changes are outlined below, along with a DHF comment.

4.3.5 Safeguards against dropping of hinged doors/gates (called up by EN 12453:2017 5.5.4.)

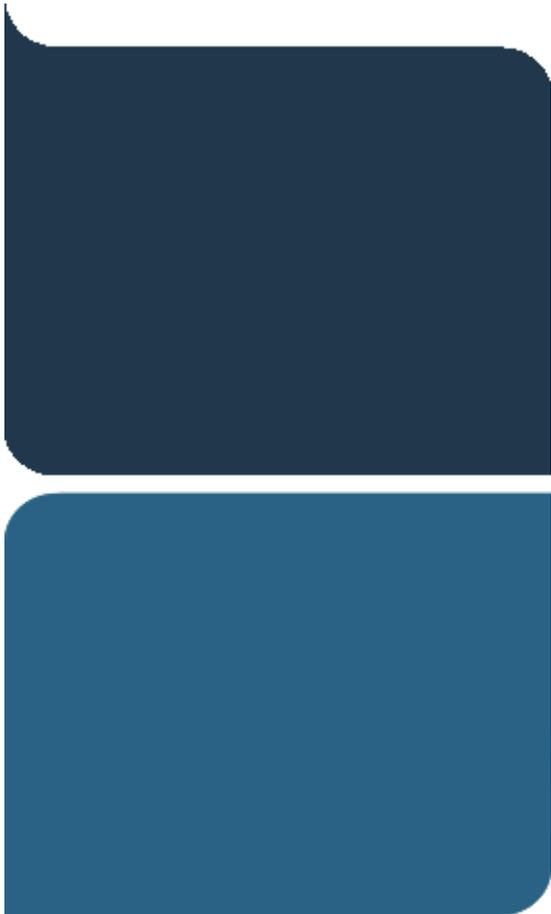
(Applies to systems installed post 2018)

In the event of a hinge failure the leaf must not drop, nor pivot more than 300mm off centre, and the leaf must be prevented from being lifted off its hinges by more than 50% of any hinge pin.

DHF comment.

This will make the use of many hinge systems unusable in two hinge format unless they can achieve the above. They will either need three hinges or utilise some form of safety strap or other protection, it would appear that simple overengineering of hinges is no longer an acceptable strategy.

As DHF TS 011/012 are currently being revised, an edit will be considered.



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