Forthcoming amendment of EN 12453:2017+A1:2021

Now that EN 12604:2017 has been amended and published in the UK as BS EN 12604:2017+A1:2020, the corresponding amendment of EN 12453:2017 is imminent. As DHF has a seat on the relevant CEN committee in Europe (acting for BSI), we are (fairly) confident that we know what the contents of the amended version will be when it is published in the UK.

It is intended that, when EN 12453:2017+A1 is published in Europe, it will go on to be harmonised with the Machinery Directive. This will then be mirrored by the UK government and it will become a 'designated' standard in the UK for compliance with the Supply of Machinery (Safety) Regulations 2008. This will mean that manufacturers will be able to claim compliance with SMSR 2008 by complying with the standard.

When this happens, it will represent a significant step forward for our industry. Ever since 2015, when the European Commission issued an effective warning against reliance on EN 12453:2000 and 2017, we have been operating in an environment where there is no fully harmonised (designated in the UK) standard available that can be used to confer compliance with machinery safety legislation. Manufacturers have had to make their own risk assessments over and above compliance with BS EN 12453:2017, as explained by the standard's National Foreword.

This amendment and subsequent designation will only affect compliance with SMSR 2008 (MD in Europe) and has no impact on compliance with the Construction Products Regulations 2013 and associated type testing. For CPR compliance, manufacturers will still have to demonstrate compliance with the much older versions of the standards as there are dated references in the designated (harmonised) product standard for CPR compliance: BS EN 13241:2003+A2:2016. CPR and SMSR compliance are not related. Manufacturers will still need to comply with EN 12453:2000 and EN 12604:2000 for CPR compliance using EN 13241, mostly via approved (notified) test laboratory type testing and comply with BS EN 12453:2017+A1 (when it is published) for SMSR compliance.

Below we have set out the most significant upcoming changes; they are not major but will have considerable impact on compliance in some areas. The highlighted text represents the significant change and the text in *red italics* is the DHF comment on its impact. We are offering this guidance as an advance 'heads up' of the expected changes so that manufacturers can begin to make preparations. We are however holding off altering the DHF COP documents until EN 12453:2017+A1 is published in Europe.

Whilst it is common practice to allow a co-existence period prior to implementation of a new standard, in this case, it is not expected that this will happen. As full harmonisation was removed from the standards back in 2015, this amendment represents a restoration of a previously withdrawn legal status. Therefore, it is expected to be effective from the day of publication. This should not have too dramatic an effect as manufacturers have already been warned to go over and above the levels of safety described by the 2017 standards. DHF TS 011 & 012 COP documents have always identified the declared shortfalls and provided solutions.

1. Control system integrity

5.1.2 Safety function performed by the control system

The combined safety-related parts of a control system (SRP/CS) which perform the safety function shall be at least PL "c" with the minimum of category 2 according to EN ISO 13849-1:2015 subject to specific exclusions made in this standard. The safety function shall be checked at the latest at one end position of the door leaf.

The safety-related parts of a control system (SRP/CS) include the processing of the signal:

- from the sensing unit of the sensitive protective equipment to the output signal switching device including the connection between the sensing unit and the drive unit
- of travel limiting devices
- of hold to run devices (the device itself need not meet category 2)
- of anti-drop devices (the device itself need not meet category 2)
- of slack cables detecting devices (the device itself need not meet category 2)

When mechanical systems are used in conjunction with other technologies, EN ISO 13849-2:2012 should be taken into account. Well-tried components can be used in the safety related parts of the control system for a safety-related application based on the application of well-tried safety principles. Components which do not meet category 2 need not be tested according to EN ISO 13849-1:2015 when based on well-tried safety principles.

Safety related parts of a control system which perform the safety function of electrical equipment in compliance with the relevant requirements of EN 60335-2-95:2015 or EN 60335-2-103:2015 as appropriate are considered to comply with the requirements of this subclause (5.1.2).

DHF note: This means that safe edge, light grid, laser scanner and limit switch devices and their circuits must achieve category 2 as installed. This is mostly a clarification of the original 2001 standard requirement. In addition, the entire control system must achieve PL C according to BS EN ISO 13849-1, but the stop switches in anti-drop devices and hold to run controls do not need to achieve category 2.

It is unlikely that simple mains switching hold to run key switches can comply with this.

2. Fall back protection

5.5.4 Falling or ejected parts or uncontrolled movement (requirement)

The door shall not be able to close uncontrolled if a component fails. The design of the door shall also ensure that, in case of a single failure, the resulting short term transient loads will not cause secondary mechanical failures of other elements of the door. Elements of the suspension or balancing system which could fail during operation of a door are balancing springs, counterweights, steel wire ropes, pulley, drums, chains, straps, belts, gears and their attaching parts.

Over-travel of leaf shall be prevented when the door is manually operated (e.g., because of power supply failure) according to EN 12604:2017+A1:2020 4.3.3:

"A vertically operating door leaf shall come to a stop and stay in position when released in any position during the opening or closing movement in normal operation."

Dropping of vertically operating door leaves shall be safeguarded either by an anti-drop device or by other design features incorporated in the suspension system (e.g., slack wire device, force sensing systems). Examples for safeguarding by other design feature are given in the informative Annex E. In the event of an anti-drop or other design feature to safeguard against dropping is activated, and where the design of the device or feature permits, such activation shall be detected and power to the door removed or operation of the door locked in the stop condition. Further operation of the door shall be prevented until necessary maintenance has been performed.

Requirements for safeguarding by an anti-drop device are specified in EN 12604:2017 +A12020, 4.3.4.

Power operated door leaves shall additionally be safeguarded against dropping in the event of a failure in the door suspension system when the door is switched over from power to manual operation.

Rigid parts such as shafts or levers, provided that they are dimensioned and designed for the maximum load and foreseeable overload, need not be considered as a potential cause of the suspension or balancing system failure.

When manual operation is achieved by decoupling the drive from the driven part the requirements of this subclause shall also be met.

An operational brake fitted to the drive is not considered to be an anti-drop safeguard.

The requirements of this paragraph may [only] be disregarded if the following two requirements are simultaneously fulfilled:

- the maximum out-of-balance of the door leaf static force occurring at the primary closing edge of the door does not exceed 200 N when there is a suspension or balancing component failure, and
- the failed component is clearly visible or detectable during normal operation of the door.

Power operated doors shall come to a rest in case of power supply interruption.

6.5.4 Falling or ejected parts or uncontrolled movement (verification)

When an anti-drop device is provided, verification of effectiveness of these devices shall be performed according to EN 12604:2017+A12020, 5.3.4:

"Faults are applied one at the time and the downward distance the door leaf moves before coming to a stop is measured. The test is repeated two more times in order to check the repeatability of the system. When required by the instructions, relevant parts of the anti-drop safeguarding and/or of the door are replaced before each test. During each test, it is verified the anti-drop safeguarding is automatically activated after the fault is applied. After each test, it is verified the door is held safely in the same position, as long as no further action in accordance with the user instructions is carried out."

Additionally, it shall be checked that hazardous movements of the door are not possible after actuation of the anti-drop device.

When means other than anti-drop devices are provided to prevent the door leaf from dropping, the following is checked:

- failure of springs, straps, steel wire ropes and chains in the door leaf balancing system are simulated one at the time. *The door shall not move downwards more than 300 mm, even the case of bouncing, or the main edge of the door shall continue normally to its lower terminal position. Either the failed component is clearly visible, or further movement of the door is not possible.*
- for doors driven by one drive, failure of the drive is simulated, the door shall not move downwards more than 300 mm.
- for doors driven by two drives, failure of one drive at the time is simulated. Either the main edge of the door stops or continues normally to its lower terminal position and that further movement is not possible.
- when switching over the door from power operation to manual operation, failures of the leaf suspension system are simulated one at a time.

It is checked by inspection and/or testing that a drive operational brake is not used as anti-drop safeguard.

DHF notes:

- *For powered shutters with internal springs, if the spring fails, either the door must stop immediately, or it can continue to the closed position at normal speed and then be prevented from further use.*
- *For manual shutters with internal springs, it is mostly business as usual. Failure of any one spring must prevent further movement, the leading edge must not drop more than 300mm (e.g., inertia safety brake or spring sensing brake).*
- *For manual sectional doors, failure of any one spring or cable must halt movement and hold the door in place unless the out of balance weight is less than 20kg and the failed component is clearly visible.*
- *For powered sectional doors, failure of any one spring or cable must either halt movement and prevent further movement, or the door can continue normally to fully close, and then must be prevented from further use, unless the failed component is **clearly** visible.*
- *This can only be ignored if the static out of balance weight at the leading edge, with any one of the balancing components failed, does not exceed 20kg and the failed component **is clearly visible**.*

If manufacturers are to rely on the 'clearly visible' clause, they will need to make this important safety instruction very clear in the user manual - e.g., "before every use, check that the spring paint marks are staggered". Whilst clearly visible may be entirely reasonable for a hold-to-run sectional door cable, is this really viable for an automatic door or for a spring mounted at 6m above ground or far away from door as with a low headroom door? It may be far better to provide a stop system.

This effectively puts an end to reliance on springs and low static weight as a means to provide fall-back protection on rolling shutters.

3. Lifting and 'riding on' hazards

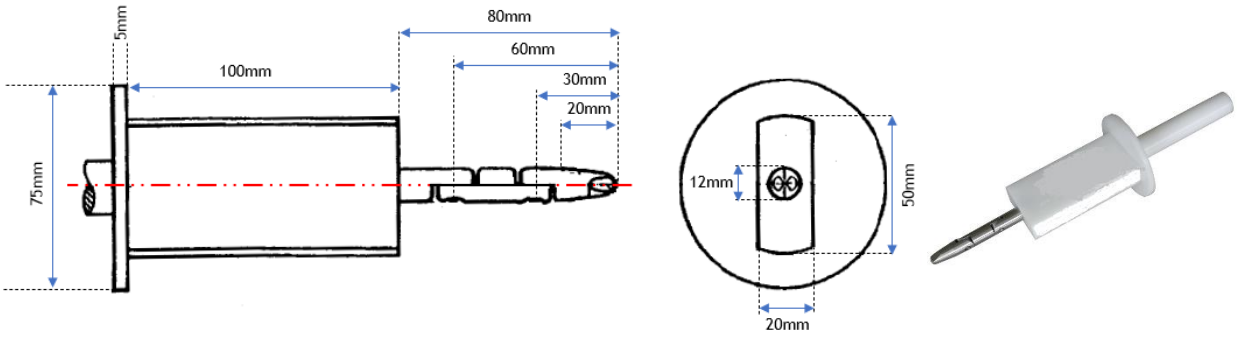
Safeguarding against hazards caused by persons traveling with the leaf.

When a person can travel with the [leaf] (either horizontally or vertically moving), the movement shall be stopped or reversed protecting any part of a person from possible hazards existing, e.g., at the lintel or other fixed parts of the building or parts of the mechanism.

Protective equipment shall avoid danger by meeting one or a combination of measures specified in 5.2.1.3 [guards], 5.2.1.5 [hold-to-run], 5.2.1.6 [force limitation] and 5.2.1.7 [non-contact presence detection].

This hazard is considered to exist if apertures or ledges which allow a person to travel with the [leaf] are located less than 2.5 m above the floor, or any other permanent access level.

The apertures are considered to allow persons to travel with the [leaf] if test probe B according to EN 61032:1998 can penetrate into the aperture in the [leaf] by more than 20 mm deep (measured at horizontal projection to the [leaf]).



The end of the test piece tapers at 74° for 10mm and then further to 37° for the last 10mm.

DHF note: As not many people will have access to a B test probe, by comparison with the dimensions, this relates to my little finger up to the first joint.

Ledges are considered to allow persons to travel with the [leaf] if they are protruding more than 40 mm from the door (measured at horizontal projection to the [leaf]).

Additionally, for vertically moving doors, to avoid drawing-in caused by travelling with the door:

- either the door shall not be able to lift a mass of 20 kg (or 40 kg for doors intended to be installed in areas out of reach of children), from the closed position
- or if the door is able to lift a mass of 20 kg (or 40 kg for doors intended to be installed in areas out of reach of children), the door shall be stopped by a protective equipment before the mass reaches any hazardous locations, e.g., at the lintel or other fixed parts of the building or parts of the mechanism of the door.

DHF note: This has changed very little other than to more clearly identify what is considered to be an aperture or ledge that would allow riding on, the previous wording was at best unclear:

"Ledges are considered to allow persons or objects to travel on the door if:

- *the upper surface is less than 18° to the horizontal plane, and*
- *the lower surface slopes upwards towards the door at an angle greater than the upper surface, and*
- *the upper surface does not slope downwards from the adjacent vertical part of the door"*

4. Testing force limitation

Annex C.3.1 General

The following clauses describe the tests necessary at the closing edges but, where other hazards of doors are being protected by limitation of forces, the values specified in Annex A shall be verified at that hazard.

DHF note: The clauses then go on to explain the main edge tests necessary. 'Other hazards' would include safe edges at draw-in & shear hazards on sliding leaves, the swept area (e.g., lower edge), reducing gaps at hinges and crush hazards at lintels on hinged leaves. Verification could mean direct measurement at the hazard or using the methods for interpreting and applying the main edge tests described in the DHF on-site-guide.

5. Instruction manuals

Information for use shall be in accordance with EN ISO 12100:2010, 6.4 taking into account all its operating modes and shall be made available with the door.

Health and safety related instructions shall be provided in paper form, all other instructions can be provided either in paper or electronic form or a link to a webpage (or similar) where the information can be found.

The specific instructions related to the safe operation of the door shall be collated together in the front section of the user instructions. The height of the characters, measured on the capital letters, shall be at least 3 mm.

The information shall contain the following:

- the business name and full address of the manufacturer and of his authorised representative
- the designation of the machinery as marked on the machinery itself, except for the serial number
- the designation of the door together with its explanation in case it is given by a combination of letters and/or numbers
- information relating to storage conditions
- information relating to installation of the door and relating to the intended use of the door, including, when needed, instructions for commissioning. When safe gaps and distances are dependent on the installation and the site conditions, the installation instructions shall precisely describe the method of ensuring that the safe gaps and distances are effective after the installation is completed
- an explanation of any protective device deployment, including necessary safety checks and any related reset function provided, e.g., in the event of activation of an anti-drop or other design feature provided to avoid further hazardous movement (see 5.5.4)
- maintenance instructions, if the door does not require maintenance, this shall be clearly stated in the instructions, otherwise the instructions shall contain the substance of the following:
  - Warning! Lack of maintenance can lead to unsafe operation
  - instruction related to cleaning
  - the nature and frequency of inspections necessary for safety
  - specification of the spare parts to be used when these can affect the safety in use of the product
- instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence need to be carried out exclusively by competent person.
- NOTE: A competent person is a person suitably trained, qualified by knowledge, skills, and practical experience, and provided with the necessary instructions to enable the required task to be carried out correctly and safely.
- the manufacturer shall specify the wearing parts of the product, their discard criteria, the required maintenance and maintenance interval
- yearly inspection of the safe functioning of the door should be recommended as a minimum
- instructions relating to maintenance actions which do not require specific skills.
- The maintenance instructions shall inform the door owner about the importance of recording any maintenance operation. An example of

content of a logbook can be found in Annex G.

- The maintenance logbook should be made available for recording all maintenance and inspection operations.
- information relating to dismantling, disabling and scrapping
- user instructions
- range of intended environmental conditions
- if the door can be used in areas in reach of children (see 5.2.2)
- User manual shall contain the substance of the following warnings:
- *'Prevent children playing with door'*
- *'Keep people away from moving power operated door'*
- where the activation of anti-drop devices or other design features prevent further operation of the drive, a warning on the importance of, and the specific checks, that should be made before any further operation, including reset if provided, is attempted
- the location where removable means for manual operation, if provided, shall be stored (see 5.4.3), the instructions shall specify that these means shall be readily accessible
- that the person operating the means provided for manual operation directly applied to the drive unit cannot be in a hazardous position, they shall also describe how to use the device for manual operation and shall require that the device is permanently stored in the vicinity of the door
- the safe position of pass doors if fitted
- any means for decoupling the drive from the door or by actuation of the drive by accessible means to avoid imprisonment
- that a disconnection means, incorporated in the fixed wiring, to ensure all-pole disconnection from the supply mains is to be provided
- where and how to correctly install electro-sensitive protective equipment, if provided, in order to prevent it from being damaged or rendered inoperative during any foreseeable operating conditions
- when the door is provided with pneumatic drive units, the information for use shall additionally include:
  - a prominent warning shall be given in the instructions of the hazard from uncontrolled movement due to stored energy
  - the instructions shall specify how stored energy can be safely released
  - means for releasing stored energy shall be suitable labelled.

The information for use shall give the A-weighted emission sound pressure level in the vicinity of these products when it is more than 70 dB or, which will generally be the case, shall indicate that this level is less than or equal to 70 dB.

When the mass of the package is more than 20 kg, the information shall be specified on the package or in the documents together with the recommended method of handling the package.

DHF note: This clause contains information that used to be contained in EN 12635. It sets out the details that must be included in instruction manuals. DHF advice always has been, and still is, to separate installation and commissioning information (targeted at the installation company) and operation and maintenance information (targeted at the end user or client).

Of particular note, is the requirement to explain in the user instructions how to identify when a safety device has activated, and what the user should do, or indeed not do, in response. This is particularly important for fall-back protection systems on vertically acting doors. When a door fails to operate or becomes stuck, it is natural for an untrained user to try and free it, very often with a manual control, which can have serious consequences.

Installation, operation and maintenance manuals are as much to guide installation companies and users, as to defend the interests of manufacturers in the face of poor installation, improper use and inadequate maintenance.

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