

## Questions/answers on EN 81-1/2 ~ A3

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This document is a guideline for better understanding of the questions raised on amendment A3 of EN 81-1 and EN 81-2.

It is the intension of WG1 that this document is freely distributed by CEN/TC10 in order to give all interested parties guidance on some Frequently Asked Questions associated with the implementation of the A3 amendment.

The amendment A3 of EN 81-1 and EN 81-2 includes the following modifications:

- Modification 1 on fixing systems of removable guards (clause 0.3.19 of EN 81-1 A3 and clause 0.3.21 of EN 81-2 A3);
- Modification 2 on restriction of scope concerning minimum rated speeds (clause 1.3 g) of EN 81-1 A3 and clause 1.3 h) of EN 81-2 A3) ;
- Modification 3 on protection against unintended movements at landings with open doors (clause 9.11 of EN 81-1 A3 and clause 9.13 of EN 81-2 A3); and
- Modification 4 on levelling and re-levelling accuracy (clause 12.12 of EN 81-1 A3 and clause 12.15 of EN 81-2 A3).

Modification 1 is related to fixing systems of guards which need to be removed for maintenance or inspection work. Preferably guards should remain in place and allow maintenance and inspection of equipment without being removed as required for protections of sheaves, pulleys and sprockets according to 9.7 of EN 81-1 or 9.4 of EN 81-2. For guards relative to door lock contacts as described in 7.7.3.1.10 the use of captive fixings has already been included. However in specific cases, depending on how a manufacturer chooses to make their design, there may be other guards which need to be removed and where this requirement of the new Machinery Directive 2006/42/EC is applicable.

Modification 2 is related to lifts with very low speeds up to 0,15 m/s. Usually lifts according to EN 81-1 and EN 81-2 have much higher rated speeds and therefore this limitation in speed has no practical impact on the lift designs. However for very specific cases this limitation coming from the new Machinery Directive 2006/42/EC may be applicable.

Modification 3 is the major item of the amendment A3 improving the safety for passengers entering or leaving the car. Although the risk of unintended movements at landings with open doors has already been partly covered by other means (e.g. double contactors and redundant brake) residual risks will be further reduced by these additional requirements.

Modification 4 is an improvement in safety and accessibility for all lifts which has already been recommended by Interpretation 578 and is now incorporated into the standards.

In order to provide adequate time to adapt products for the main items, 3 and 4, which are not related to the new Machinery Directive a transition period of 18 months has been adopted. During this period existing EN 81-1 and EN 81-2 including their amendments A1 and A2 maintain the presumption of

conformity. However modifications 1 and 2 need to be respected immediately when the new Machinery Directive is coming in force for specific cases as mentioned above.

Clause	Question/Problem	Answer
<b>3.xx</b> <b>EN81-1/2</b>	Definition for guards mentioned in § 0.3.19 is missing.	The definition is given in the Machinery Directive which for lifts could be understood as:  <i>guard (protecteur) (trennende Schutzeinrichtung)</i> guards means a part of the lift used specifically to provide protection against mechanical, electrical or any other hazards by means of a physical barrier.
<b>0.3.19</b> <b>EN81-1/2</b>	<b>Guards</b> <b>0.3.19</b> The fixing system of guards, which have to be removed during maintenance and inspection, remains attached to the guard or to the equipment, when the guard is removed.  Question:  Which covers and protections have to be considered as guards having to comply with this requirement?	Clarification of assumption 0.3.19: This clause is related to those guards which have to be regularly removed for inspection and maintenance. e.g. once in two years or more often
<b>9.11.1</b> <b>Note</b>	NOTE A failure of the traction sheave includes a loss of traction.  Does this mean that loss of traction is never considered under the requirements of A3 ?	The note was intended to explain that movement away from the standstill position at a landing due to loss of traction need not be considered. This is due to ensuring adequate traction by test at time of installation.  However, should rope slippage occur at the moment of stopping the lift after detection due to the rapid deceleration, this must be taken into account when determining the final stopping distances.

Clause	Question/Problem	Answer
<p><b>9.11.1</b> <b>EN 81-1</b></p> <p><b>9.11.3</b> <b>EN81-2</b> Similar Q&amp;A</p>	<p><b>Consideration of failures for worst case</b></p> <p><b>9.11</b> Protection against unintended car movement</p> <p><b>9.11.1</b> Lifts shall be provided with a means to stop unintended car movement away from the landing with the landing door not in the locked position and the car door not in the closed position, as a result of failure in any single component of the lift machine or drive system upon which the safe movement of the car depends, except failure of the suspension ropes and the traction sheave of the machine.</p> <p>Question:</p> <p>Which worst case scenarios need to be considered to be covered by the protection means?</p>	<p>Only single failures in the lift machine or the drive system which may lead to an unintended movement need to be considered at a point in time. Failures and their consequences on unintended movements have to be analysed to determine the worst possible conditions.</p> <p>It can be assumed that internal monitoring means of the lift and drive control (e.g. monitoring of speed when re-levelling, monitoring of maximum motor current or torque, etc.) will prevent extreme cases of unintended movements provided their design is inherently safe and/or their functionality is regularly checked and/or tested. These monitoring means are not part of the protection means and don't need to be safety devices.</p>
<p><b>9.11.1</b> <b>EN81-1</b></p>	<p><b>"control system"</b></p> <p>There seems to be a difference in translation of the term "control system" between the German and English versions of EN81-1.</p> <p>Which shall be taken as correct ?</p>	<p>Unfortunately there appears to be an error in the understanding of the translation due to the terminology used being able to be understood in different ways. The English version is correct.</p> <p>The drive control system includes those electric circuits which cause the movement of the lift machine. Electric safety devices and the safety chain are excluded.</p> <p>This will be corrected either by corrigendum or at latest by the publication of EN81-20</p>

Clause	Question/Problem	Answer
<p>9.11.1 9.11.2 EN81-1</p>	<p><b>Protection means in case of electric lifts without releveling</b></p> <p><b>9.11</b> Protection against unintended car movement</p> <p><b>9.11.1</b> Lifts shall be provided with a means to stop unintended car movement away from the landing with the landing door not in the locked position and the car door not in the closed position, as a result of failure in any single component of the lift machine or drive system upon which the safe movement of the car depends, except failure of the suspension ropes and the traction sheave of the machine.</p> <p><b>9.11.2</b> The means shall detect unintended movement of the car, shall cause the car to stop, and keep it stopped.</p> <p>Question:</p> <p>For some electric lifts with low rise re-leveling may not be necessary due to limited movements during loading and unloading at landings. If the lift is not equipped with levelling and re-leveling control according to EN 81-1, clause 14.2.1.2 there is no risk of unintended electric movements with open doors.</p> <p>If the machine brake is designed as braking element of the protection means, the following questions arise:</p> <ul style="list-style-type: none"> <li>a) Is there a need for a device to detect unintended movements?</li> <li>b) Is it in compliance with A3 if the machine brake has sufficient braking force or torque to keep the car stationary?</li> <li>c) What has to be checked in the type examination?</li> <li>d) How shall the protection means be tested at the final examination of the lift?</li> </ul>	<p>The specific solution without detection device for lift systems without levelling/relevelling system is currently not covered by A3 § 9.11.</p> <p>This should be considered by the revision of EN 81-1. In the meantime such design is subject to NB approval.</p>

Clause	Question/Problem	Answer
<p><b>9.11.3</b> <b>EN81-1</b></p> <p><b>9.13.3</b> <b>EN81-2</b> Similar Q&amp;A</p>	<p><b>Self monitoring of the brake system</b> As per assumption <b>9.11.3</b> of the EN 81-1:1998/A3:2009 ("Self-monitoring is subject to type examination.").</p> <p>The topic self-monitoring is named more times in the standard ( 9 Modification to D.2 – p) and F.8.3.1 Method of Test), but is not clearly defined. It seems that the standard does not adequately explain the exact relevance and also the interval of necessary tests.</p>	<p>"Self-monitoring" implies automatic test to guarantee the functioning of the means, the frequency for regularly check it depending of the design and therefore it shall be based on risk assessment by the manufacture. Appropriate self monitoring is subject to type examination.</p>
<p><b>9.11.3</b> <b>EN81-1</b></p>	<p>In the case of using the machine brake, self-monitoring <b>could</b> include verification of correct lifting or dropping of the mechanism or verification of braking force. If a failure is detected, next normal start of the lift shall be prevented.</p> <p>Question 1 The German text appears not to give an option but demands this. Which version is correct the English or German ?</p> <p>Question 2 The word "could" is unusual since normally the terms "should" or "shall" are used. Does this mean that there is an option not to have any monitoring where the brake is used as a means to prevent uncontrolled movement?</p>	<p>Answer 1 Unfortunately there appears to be an error in the understanding of the translation due to the terminology used being able to be understood in different ways. The English version is correct.</p> <p>This will be corrected either by corrigendum or at latest by the publication of EN81-20</p> <p>Answer 2 The term "<b>could</b>" was only intended to be used to indicate that there are different means by which verification might be achieved e.g, by monitoring the lifting or lowering of the brake or by monitoring brake force. In any case where the brake is used as a means to prevent uncontrolled movement some form of monitoring is required.</p>

Clause	Question/Problem	Answer
<p><b>9.11.3</b> <b>EN81-1</b></p> <p><b>9.13.3</b> <b>EN81-2</b> Similar Q&amp;A</p>	<p>“Self-monitoring is subject to type examination.”</p> <p>Question 1 Why is there no requirement for this device to be CE marked. Does this mean that it is not necessary to have the means certified by a Notified Body?</p> <p>Question 2 Is the self-monitoring part of the safety component and does it have to be type-tested ?,</p>	<p>Answer 1. There is no requirement to CE mark any component in the EN81-1/2 standards. This only comes as a requirement in the Lifts Directive.</p> <p>Since the protection device against unintended car movement including self-monitoring is not listed as a safety component in the Lifts Directive the type testing might be carried out by the manufacturer. The requirement for type-examination for the protection device can be found in 9.11.3 and 9.11.8 and the procedure for type-examination is in Annex F.8.</p> <p>Answer 2. Yes this is part of the safety device for unintended car movement and this is included in the type test (see above). However the design of the self-monitoring does not have to comply with the requirement for the electric safety devices.</p>
<p><b>9.11.5</b> <b>EN81-1</b></p>	<p><b>Moving from a standstill</b> In 9.11.6 it is clearly stated that the movement with open doors is considered as "moving away from a standstill position at landing level".</p> <p>Should the same requirement also have been stated in 9.11.5 ?</p>	<p>Unfortunately this was missed from the final version sent for publication by CEN. This will be corrected either by corrigendum or at latest by the publication of EN81-20.</p>
<p><b>9.11.6</b> <b>EN81-1</b></p>	<p><b>Moving from a standstill</b> The words "moving away from a standstill position at landing level" seem to be missing from the German and French versions of EN 81-1:1998+A3:2009, but present in the English version.</p> <p>Which is correct ?</p>	<p>Unfortunately there appears to be an error in the CEN text sent for publication by AFNOR and DIN. The English version is correct. This will be corrected either by corrigendum or at latest by the publication of EN81-20</p>

Clause	Question/Problem	Answer
<p><b>9.11.6</b> <b>EN81-1</b></p>	<p>This clause states :</p> <p><i>"During the stopping phase, the stopping element of the means shall not allow a retardation of the car in excess of:</i></p> <ul style="list-style-type: none"> <li><i>– 1 g<sub>n</sub> for unintended movements in up direction,</i></li> <li><i>– the values accepted for safety gears in down direction.</i></li> </ul> <p><i>These values shall be obtained with any load in the car, up to 100 % of rated load, moving away from a standstill position at landing level."</i></p> <p>Our question is : Why are the requirements different in the up and down travel.</p>	<p>The deceleration value in the up is limited to 1gn to prevent persons rising above the floor when the stopping means is applied. For the down direction it is intended to allow the use of existing safety gear designs as a stopping means. Therefore the deceleration value is consistent with these means.</p>
<p><b>9.11.9</b> <b>EN81-1/2</b></p>	<p><b>Control of keeping the car stopped</b></p> <p>When the means has been activated or the redundancy monitoring has indicated a failure of the stopping element of the means, the reset of the lift shall require the intervention of a competent person. Reset shall not happen by a power failure.</p> <p>Question</p> <p>Detection device itself is an electric safety device. Memory function of unintended movement should not be by default electric safety device. Memory function is comparable to run time limiter and main contactor release monitoring. See also 9.9.2.2.3..</p> <p>Is this correct understanding?</p>	<p>Yes, reset shall not happen by a power failure, the intervention of a competent person is needed.</p>

Clause	Question/Problem	Answer
<p><b>9.13 EN81-2</b></p>	<p><b>Braking elements to prevent unintended car movement in up-direction for hydraulic lifts</b></p> <p><b>9.13 Protection against unintended car movement</b></p> <p><b>9.13.1</b> Hydraulic lifts shall be provided with a means to stop unintended car movement away from the landing ...</p> <p><b>9.13.2</b> The means shall detect unintended movement of the car, shall cause the car to stop, and shall keep the lift out of operation.</p> <p><b>9.13.3</b> The means shall be capable of performing as required without assistance from any lift component that, during normal operation, controls the speed or retardation, stops the car or keeps it stopped, unless there is built-in redundancy and correct operation is self-monitored. ...</p> <p>Self-monitoring is subject to type examination.</p> <p><b>9.13.4</b> The stopping element of the means shall act:  - on the car, or  - on the rope system (suspension), or  - on the hydraulic system (including the motor/pump in up direction)  The stopping element of the means may be common with the braking elements preventing overspeed in down direction (e.g. safety gear).  The stopping elements of the means may be different for the down direction and for the up direction.</p> <p><b>Question:</b>  In normal hydraulic lifts the car is stopped by gravity and friction acting against the hydraulic system which due to inertias may continue to pump oil in the cylinder. In addition the up valve will open simultaneously and will also stop the car. Depending on the performance of the valve and on the inertias in the system the car may not be stopped according to the limits specified in 9.13.5 in extreme cases.</p>	<p><b>Answer 1:</b>  The elements that are required to test (according to the indications given in Annex F.9) are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> the motor/pump assembly under the lowest static pressure at which it can be used.</li> <li><input type="checkbox"/> The by-pass valves assembly, only if the motor is not supplied by two independent contactors.</li> </ul> <p><b>Answer 2:</b></p> <p>a) When two contactors (see 12.4) cut the supply to the motor/pump assembly, they are redundant and are monitored at each operation, This is sufficient to guarantee the stopping of the car.</p> <p>b) When a single contactor (see 12.4) is provided, then the lift might stop due to the opening of the by-pass valves, which is redundant with the single contactor.</p> <p>The redundancy applies also to the supply of the by-pass valves, which is also monitored (see monitoring in <b>12.4.3</b>).</p> <p><b>Rationale:</b>  The car stops due to gravity, which is always present, therefore cannot be required to be redundant.  The cause for stopping is:</p> <ul style="list-style-type: none"> <li>a) the cutting of the supply to the motor/pump assembly via one or two contactors, or</li> <li>b) the opening of the by-pass valves, or</li> <li>c) both a) and b) at the same time.</li> </ul> <p>When two contactors cut the supply to the motor/pump assembly, they are redundant and are monitored at each operation, This is sufficient to guarantee the stopping of the car.</p> <p>When a single contactor is provided, then the lift might stop due to the opening of the by-pass valves, which is redundant with the single contactor.</p> <p>The redundancy applies also to the supply of the by-pass valves, which</p>



Clause	Question/Problem	Answer
	<p>1. Which elements have to be considered part of the stopping element and which need to be type tested?</p> <p>2. Do these elements have to be redundant and self-monitored?</p>	<p>is also monitored.</p> <p>(see monitoring in <b>12.4.3</b>)</p> <p>The stopping distance might be corrected in case of lifts with balancing weight by adding the jump of the empty car due to the combined inertia of car and balancing weight.</p> <p><b>Extract from existing text in EN 81-2</b></p> <p><b>12.4.3</b> If whilst the lift is stationary, one of the contactors has not opened the main contacts or one of the electrical devices has not opened, a further start shall be prevented, at the latest at the next change in the direction of motion.</p>
<p><b>9.13.1</b></p>	<p>At the end of the paragraph it states "except failure of the suspension ropes, flexible hoses, steel piping and cylinder"</p> <p>Should the failure of Chains also be excluded</p>	<p>Unfortunately this was an error.</p> <p>This will be corrected either by corrigendum or at latest by the publication of EN81-20.</p>
<p><b>9.13.5</b> <b>9.13.6</b> <b>EN81-2</b></p>	<p>These clause do not appear to be consistent with EN81-1 where it is stated that the car is considered as "moving away from a standstill position at landing level"</p> <p>Why is there a difference ?</p>	<p>Unfortunately this was an error. It was intended also for these words to be in the hydraulic standard text.</p> <p>This will be corrected either by corrigendum or at latest by the publication of EN81-20.</p>

Clause	Question/Problem	Answer
<p><b>F.8</b> <b>EN81-1/2</b></p>	<p><b>Separate type examination for detection device and braking element</b></p> <p>F.8 Unintended car movements protection means</p> <p>Question:</p> <p>On the market suppliers for detection devices which may be integrated in the lift control system and for braking elements may be different. Furthermore lift installers may wish to combine detection devices and braking devices from different suppliers. For that reason it would be beneficial to separate the type examination and the certificate for both parts of the protection means.</p> <p>Under which condition is it possible to separate the type examination and related certificate for detection devices and braking elements of the unintended movements protection means?</p>	<p>It is acceptable to separate the type examination and the certificate under the following conditions:</p> <ul style="list-style-type: none"> <li>a) The interface in-between both parts have to be clearly specified.</li> <li>b) It has to be specified whether the switching gear which is triggered by the detection device and which actuates the braking element is part of the detection device or part of the braking element.</li> <li>c) It has to be specified at which maximum distance from the landing and at which maximum speed the braking element has to be actuated at the latest in order to satisfy the requirements according to 9.11.5.</li> </ul> <p>If for an individual use this approach is not possible at least the relevant performance parameters of the sub-system have to be checked and certified which can be used to determine the performance of the complete protection means.</p>