

# Changes in the Product Standard for Safety Light Curtains:

## What Does this Mean for the User and the Supplier?

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### Executive Summary

The product standard for safety light curtains, IEC 61496-1, has been reworked to reflect the requirements of the safety standards ISO 13849 and IEC 62061. These changes only affect new installations that previously utilized Type 2 safety light curtains.

Existing users do not have to upgrade in the case where they are already using Type 2 safety light curtain products in existing installations.

In the case where there are changes in an existing installation which requires a new risk assessment, the changes in the product standard have to be considered.

In Europe, for all new applications installed after the May 10, 2015, the changes in this document must be considered. It can be assumed that other regions/countries will implement the changes of the IEC standard at some point in the future within their local legislative.

Rockwell Automation offers the following Type 2 safety light curtains, which are affected:

Light Curtain	Cat. No.
GuardShield Type 2	440L-P2... [pair]
	440L-T2... [transmitter]
	440L-R2... [receiver]
GuardShield Safe 2	445L-P2... [pair]
	445L-T2... [transmitter]
	445L-R2... [receiver]

### Introduction

For certification as a safety product, safety light curtains are tested according to the requirements of the related product standards. For safety light curtains these are the standards IEC 61496-1 and IEC 61496-2. The standard IEC 61496-1 has been reworked to reflect the requirements of the safety standards ISO 13849 and IEC 62061.

### Product Standards Safety Light Curtains

IEC 61496-1 and IEC 61496-2 define requirements for different “Types” of safety light curtains: Type 2 and Type 4.

Each Type of safety light curtain has differing requirements regarding the limits of, for example, optical angles, ambient light resistance and EMC immunity.



The light curtain Type number correlated for many years with safety categories 2 and 4 from the former standard EN 954. Due to the discontinuation of EN 954 and its replacement with ISO 13849 and IEC 62061, this comparison is now no longer valid.

<b>IMPORTANT</b>	A Type 3 safety device is mentioned in IEC 61496-1, but detailed specifications about this type are not yet available in IEC 61496-2. This means that only Type 2 and Type 4 safety light curtains can be selected today.
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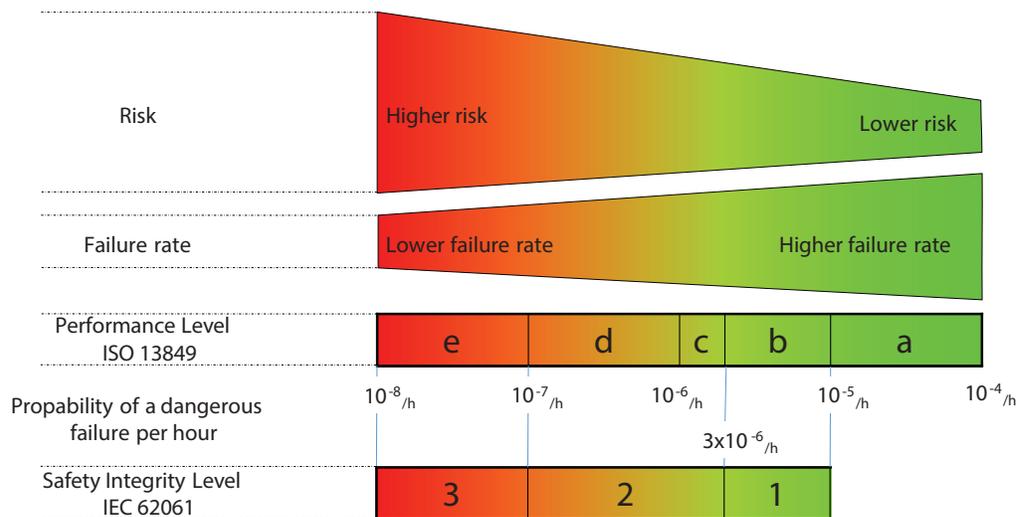
### Modifications to Safety Light Curtain Product Standard

The new Edition 3.0 of IEC 61496-1 now specifies which characteristics must be fulfilled in reference to the Performance Levels (PL) of ISO 13849 as well as the Safety Integrity Levels (SIL) of IEC 62061 and IEC 61508. In addition, the new edition designates which Type of safety light curtain has to be used in order to satisfy a certain Performance Level (PL) or Safety Integrity Level (SIL).

From an electrical hardware reliability point of view a Type 2 safety light curtain may fulfill PLd/SIL2, but the limits with regard to systematic requirements such as ambient light resistance or mirroring caused by optical angles are now implemented in the new version of IEC 61496-1. This means that a supplier of safety light curtains is no longer able to declare a Type 2 product as PLd based purely on electrical properties.

### Consequences for the User

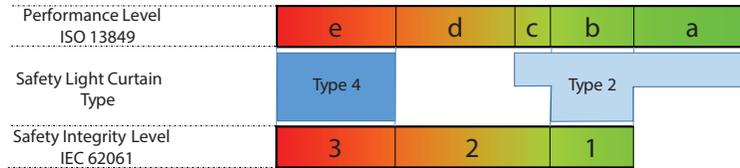
During design of a new application it is necessary to perform a PL or SIL allocation process according to a risk analysis (more details about these steps are described in *Safebook 4 - Safety Related Control Systems for Machinery*, publication number SAFEBK-RM002B-EN-P, a reference manual published by Rockwell Automation). This process leads the user to a required PL or SIL. One part of meeting the required PL or SIL is the probability of dangerous failure rate for the safety function. Figure 1 shows the correlation between the probability of a dangerous failure and the corresponding PL and SIL values.



**Figure 1**

Safety functions addressing a high risk require safety components with a high level of integrity. Such safety components are characterized by a PL= e and/or SILcl=3 rating.

The new version of IEC 61496-1 now constrains which SIL or PL can be achieved with which Types of safety light curtains. Figure 2 and Table 1 show the correlation:



**Figure 2**

	"Type" of safety light curtain			
	Type 1	Type 2	Type 3	Type 4
Maximum PL-respectively SIL-level which can be obtained using corresponding safety light curtain "Types"	—	SIL 1 and/or PL c	SIL 2 and/or PL d	SIL 3 and/or PL e

**Table 1**

This means a Type 2 safety light curtain (e.g. 440L GuardShield Type 2 and 445L GuardShield Safe2) can only be used for safety functions which require PL c or SIL 1. For applications which require SIL 2 or PL d, a Type 2 safety light curtain that previously could have been selected will no longer meet this requirement. Theoretically a Type 3 safety light curtain would be required. But as explained above, the product standard IEC 61496-2 does not yet define a Type 3 safety light curtain. Consequently a Type 4 safety light curtain must be used.

<b>IMPORTANT</b>	Optical safety sensors complying with Type 3 do exist, for example: laser scanners (Rockwell Automation Cat. No.: 442L-SFZ...) or safety cameras (Cat. No. 442L-SAFCAM1).
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## Dates

European Union: IEC 61496-1 Edition 3.0 was published in April 2012. As a European standard EN 61496-1 was first listed April 11, 2014, in the Official Journal of the European Union. In Europe the transition period to the new version of the standard ends on May 10, 2015. After that, the presumption of conformity using Edition 2.0 is no longer valid. This applies to designers in the European Union as well as any supplier providing Type 2 safety light curtain applications to the European Union.

Other regions: A statement about other regions/countries cannot be made at this time. When each region/country will implement the new IEC standard in their local legislative is not yet known.

## Relevance for Previously Installed Type 2 Safety Light Curtains

In the European Union IEC/EN 61496-1 is mandated under the Machinery Directive which applies only to the supply of products, not the use of products (that is the Use of Work Equipment Directive). So there is no legal requirement in the EU to upgrade just because the standard changed. However, the new version of IEC/EN 61496-1 does represent "state of the art," so customers would be advised to review their existing installations in light of the new version.

Any modification at a previously installed application which requires a new risk assessment may mean that the Type 2 light curtain has to be replaced with a Type 4 safety light curtain.

A statement about other regions/countries cannot be made at this time.

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
IEC 61496-1: Safety of machinery	Electro-sensitive protective equipment – Part 1: General requirements and tests (2012-04). IEC Central office, Geneva 2012
IEC 61496-2: Safety of machinery	Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) January 2015
ISO 13849-1: EN ISO 13849-1: Safety of machinery	Safety related parts of control systems -- Part 1: General principles for design. May 2008
IEC 62061: IEC/EN 62061: Safety of machinery	Functional safety of safety related electrical, electronic and programmable electronic control systems. June 2013
Safebook 4	Rockwell Automation Publication: SAFEBK-RM002B-EN-P—March 2011

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley® distributor or Rockwell Automation® sales representative.

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