BG ETEM
Energie Textil Elektro
Medienerzeugnisse

baua:
Federal Institute for Occupational
Safety and Health

Laser products considered to be machinery covered by the Machinery Directive

An overview regarding the relevance of EU Directives when assessing the safety of laser products

Introduction

Laser components and systems feature a high level of innovation and are meanwhile part of many modern work systems in research and industry. Laser products are enjoying an increasing popularity in the consumer markets.

The European internal market legislation provides the legal framework for a consistent safety level of products made available on the European market. There are specific European regulations regarding the safety of certain product categories such as the Low-Voltage Directive 2006/95/EC or the Machinery Directive 2006/42/EC.

Moreover, it can be necessary to apply further European Directives, in addition to the Machinery Directive, in particular in cases of risks or if aspects appear which are not or only partially covered by the Machinery Directive, e.g. the Pressure Equipment Directive, the ATEX Directive or the EMC Directive.

For products without specific regulations by the European law the General Product Safety Directive defines general safety and health requirements.

However, practical uncertainties remain concerning the relevance of regulations for certain laser products.

The purpose of the present document is to provide an overview of Directives applicable in terms of their relevance for typical laser products. The main issue, though, is to show up which products are subject to the Machinery Directive 2006/42/EC. This document should serve as a guideline for all concerned parties in the field of construction and manufacture, for purchasers and users of laser products as well as for market surveillance and testing authorities.

An essential component is a correlation table of typical laser products and associated regulations for ensuring the safety of such products. An attachment contains additional explanations and justifications as well as bibliographical references.

This document reflects the expert opinion of a task force of BG ETEM and BAuA consisting of laser and machinery safety experts.

1 Terminology

1.1 Definition laser product

The word **LASER** is an acronym composed of the words "**L**ight **A**mplification by **S**timulated **E**mission of **R**adiation". A laser provides coherent monochromatic radiation with high energy and power density and a distinct characteristic of radiation emission, i.e. focused, nearly parallel radiation is typical for such a source of optical radiation.

Products emitting laser radiation in the wavelength range between 100 nm and 1 mm are referred to as laser products. Those with an emission duration of more than 0.25 s are called continuous wave (cw) lasers. Pulsed lasers generate pulses in the range between femtoseconds and 0.25 s depending on their type and application.

A laser product can be composed of a single laser source including a power supply unit or can be a component of a machine, e.g. a laser processing machine (welding, cutting).

Note:

In this document protective devices which do not emit laser radiation by themselves such as laser protective cabins and laser guards are considered in addition.

1.2 Relevant definitions according to article 2 Machinery Directive 2006/42/EC

According to article 2 of the Directive 2006/42/EC the term **machinery** means:

a)

- an assembly fitted with or intended to be fitted with a drive system other than directly applied human or animal effort, consisting of linked parts or components, at least one of which moves, and which are joined together for a specific application,
- an assembly referred to in the first indent, missing only the components to connect it on site or to sources of energy and motion,
- an assembly referred to in the first and second indents, ready to be installed and able to function as it stands only if mounted on a means of transport, or installed in a building or a structure,
- assemblies of machinery referred to in the first, second and third indents or partly completed machinery referred to in point (g) which, in order to achieve the same end, are arranged and controlled so that they function as an integral whole,
- an assembly of linked parts or components, at least one of which moves and which are joined together, intended for lifting loads and whose only power source is directly applied human effort.

Note on **machinery according to annex IV Machinery Directive**:

Annex IV sets out the list of categories of machinery that may be subject to one of the two conformity assessment procedures involving a Notified Body: EC type examination or full quality assurance. Machinery belonging to one of the categories listed in Annex IV may also be subject to the procedure for assessment of conformity with internal checks when it is manufactured in accordance with harmonised standards that cover all of the applicable essential Health and safety requirements.

b) Interchangeable equipment

A device which, after the putting into service of machinery or of a tractor, is assembled with that machinery or tractor by the operator himself in order to change its function or attribute a new function, in so far as this equipment is not a tool.

c) Safety component

Component

- which serves to fulfil a safety function,
- which is independently placed on the market,
- the failure and/or malfunction of which endangers the safety of persons, and
- which is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

g) Partly completed machinery

An assembly which is almost machinery but which cannot in itself perform a specific application. … Partly completed machinery is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery to which this Directive applies.

2 Relevant European Directives

This document takes into account the European internal market directives with requirements for the design of save products. Other directives that have to be applied in addition if necessary are not covered in the detailed examination of the selected laser products.

For laser products covered in this information the following Directives can apply:

- General Product Savety Directive (GPSD) 2001/95/EC,
- Low Voltage Directive (LVD) 2014/35/EU
- Machinery Directive (MD) 2006/42/EC

The scope of the Directives is described below.

2.1 General Product Safety Directive

The General Product Safety Directive 2001/95/EC provides a generic definition of a safe product. It applies to products which are intended for consumers or likely, under reasonably foreseeable conditions, to be used by consumers even if not intended for them, including in the context of providing a service. In addition the directive sets requirements belonging to market surveillance, reporting procedures for dangerous products and obligations to the market operators.

The Directive applies in absence of specific European regulations on safety of certain product categories and complements the provisions of sector legislation, which do not cover certain matters.

Note:

Products for which no specific European regulations on safety exist are also called as "products of the non-harmonised sector".

2.2 Low Voltage Directive 2014/35/EU

The Low Voltage Directive 2014/35/EU ensures that electrical equipment within certain voltage limits fulfills essential health and safety requirements. The directive applies to electrical equipment operating with a voltage between 50 and 1000 V for alternating current and between 75 and 1500 V for direct current.

Notes:

For laser products not to be considered as machinery acc. the definitions in chapter 1.2, the Low Voltage Directive applies, if these products can be regarded as electrical equipment with an electrical supply inside the voltage limits of the Low Voltage Directive.

In the Machinery Directive 2006/42/EC the reference is made to the "old" Low Voltage Directive 73/23/EC. The Directive 2014/35/EU replaces the Directive 2014/95/EC, which was a codified version of the "original" Low Voltage Directive 73/23/EC. References to Directive 73/23/EC should be read as references to Directive 2014/35/EU.

2.3 Machinery Directive 2006/42/EC

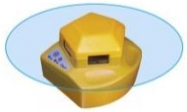
The Machinery Directive harmonises the requirements for machinery and for products that are equated to machinery (e.g. interchangeable equipment, safety components) and to partly completed machinery with respect to health and safety. The aim is to guarantee a free movement of safe machinery within the European Economic Area.

Note:

Based on the definition in chapter 1.2 it has to be checked if laser products are machinery, products that are equated to machinery (e.g. interchangeable equipment, safety components), or partly completed machinery. Then, the Machinery Directive 2006/42/EC applies.

The safetyobjectives of the Low Voltage Directive 2014/35/EU have to be fulfilled for Laser products considered to be machinery and produce electrical hazards. But the procedures for machinery relating to conformity assessment, the placing on the market or putting into service are governed exclusively by the Machinery Directive 2006/42/EC. This means that the Declaration of conformity for machinery subject to the Machinery Directive shall not refer to the LVD.

3 Table of relevance of EU directives for selected Laser products

N°	Laser product	Picture	Description	2006/95/EG Low Voltage Directive	2006/42/EG Machinery Directive	2006/42/EG machinery according to annex IV	Non harmonised sector	Rationale
1	Levelling Laser with integrated rotating mirror				X			Definition machinery (art. 2 a) MD) applicable and exclusions “information technology equipment” and “audio and video equipment” acc. art. 1 (2) k) MD not applicable
2	2D-/3D- Laser scanner not for safety functions		Rotating movement of the laser head and integrated rotating mirror		X			Definition machinery (art. 2 a) MD) applicable and exclusions “information technology equipment” acc. art. 1 (2) k) MD not applicable
3	2D-/3D- Laserscanner for safety functions				X	X		Definition safety component (art. 2 c) MD) applicable and Protective devices designed to detect the presence of persons (ann. IV item 19 MD) applicable
4	Laser pointer battery powered handheld		Only laser of class 1, 1M, 2, 2M acc. to EN 60825-1 acc. COM Decision 2014/59/EU				X	Definition machinery (art. 2 a) MD) not applicable and outside the voltage limits of the LVD

N°	Laser product	Picture	Description	2006/95/EG Low Voltage Directive	2006/42/EG Machinery Directive	2006/42/EG machinery according to annex IV	Non harmonised sector	Rationale
5	Laser-spirit level battery powered without integrated rotating mirror		Only laser of class 1, 1M, 2, 2M acc. to EN 60825-1 acc. COM Decision 2014/59/EU				X	Definition machinery (art. 2 a) MD) not applicable and outside the voltage limits of the LVD
6	Show and projection Laser		For projection of visible laser radiation on surfaces or objects to produce light effects or light patterns.		X			Exclusion audio and video equipment acc. art. 1 (2) k) MD and § 65 guide MD 2006/42/EC not applicable
7	Laser projector		Laser based projectors for reproducing image and video content	X				Exclusion audio and video equipment acc. art. 1 (2) k) MD and § 65 guide MD 2006/42/EC applicable
8	Laser source for integration in / use with machinery		Unit intended only for generation of a beam, equipped with ventilators or water pumps		X			Definition partly completed machinery (art. 2 g) MD) applicable
9	Laser source with deflection unit for integration in / use with machinery		Laser beam is deflected to the working position (e. g. inscription Laser)		X			Definition partly completed machinery (art. 2 g) MD) applicable

N°	Laser product	Picture	Description	2006/95/EG Low Voltage Directive	2006/42/EG Machinery Directive	2006/42/EG machinery according to annex IV	Non harmonised sector	Rationale
10	Laser machine				X			Definition machinery (art. 2 a) MD) applicable
11	Laser machine with fixed Laser source for working handheld work pieces				X			Definition machinery (art. 2 a) MD) applicable
12	Laser machine with hand guided Laser head		Stationary Laser source, equipped with ventilators or water pumps		X			Definition machinery (art. 2 a) MD) applicable
13	Laser safety cabin (passive), case a)		constructed according to precise specifications of the manufacturer of the machine, for which it is intended to protect against Laser radiation, assembled with the machine and placed on the market as an assembly by the manufacturer of the machine					no independently placing on the market

N°	Laser product	Picture	Description	2006/95/EG Low Voltage Directive	2006/42/EG Machinery Directive	2006/42/EG machinery according to annex IV	Non harmonised sector	Rationale
14	Laser safety cabin (passive), case b)		Designed for a custom-made machine, for which it is intended to protect against Laser radiation and independently placed on the market		X			Definition safety component (Art. 2 c) MD) applicable
15	Laser safety profile for integration in / use with machinery		Intended to protect against Laser radiation		X			Definition safety component (Art. 2 c) MD) applicable
16	Laser safety curtain		Mobile protective device against Laser radiation (see also EN 12254)		X			Definition safety component (Art. 2 c) MD) applicable
17	Laser safety wall (active)		Including sensors and complex control		X	X		Definition safety component (Art. 2 c) MD) applicable, logic unit to ensure safety functions (Annex IV Nr. 21 MD) applicable
18	Beam deflector with control system and declaration of PL/SIL		Intended for deflection of the Laser beam and monitoring of the single fibres, independently placed on the market		X	X		Definition safety component (Art. 2 c) MD) applicable, logic unit to ensure safety functions (Annex IV Nr. 21 MD) applicable

Annexes

A1 *Explanations to the table in chapter 3*

A1.1 *Leveling laser with integrated rotating mirror*

Mechanical parts

Integrated rotating mirror

Applicable Directives

- 2006/42/EC (MD)

Rationale

The leveling laser is considered to be **machinery** because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

Therefore, the **definition acc. art. 2 a) MD is applicable**.

Exclusions are **not** applicable.

Explanation to critical exclusions

1. The exclusion acc. art. 1 (2) letter k, third indent of the directive 2006/42/EC is not applicable, because a levelling laser is not information technology equipment. According to the guide to MD § 66 the exclusion concerns equipment used for the processing, conversion, transmission, storage, protection and retrieval of data or information. This is not applicable to a levelling laser, because the incorporated laser does not transmit “data” or “information”.

2. The exclusion acc. art. 1 (2) letter k, second indent of the directive 2006/42/EC is not applicable, because a levelling laser is not audio and video equipment. According to the guide to MD § 65 the exclusion concerns equipment such as, for example, […] projectors. This is not applicable to a levelling laser, because in contrast to projectors no moving picture is projected.

A1.2 *2D-/3D-laser scanner not for safety functions*

Mechanical parts

Integrated rotating mirror
Rotating movement of the laser head / 2D-Laser scanner

Applicable Directives

- 2006/42/EC (MD)

Rationale

The 2D-/3D-Laser scanner is considered to be **machinery**, because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

Therefore the **definition acc. art. 2 a) MD is applicable**.

Exclusions are **not** applicable.

Explanation to critical exclusions:

The exclusion acc. art. 1 (2) letter k, third indent of the directive 2006/42/EC is not applicable, because a 2D-/3D-Laser scanner is not information technology equipment. According to the guide to MD § 66 the exclusion concerns equipment used for the processing, conversion, transmission, storage, protection and retrieval of data or information.

This is not applicable to a 2D-/3D-Laser scanner, because

- the incorporated laser does not transmit “data” or “information”,
- the overall system only incorporates the laser. The exclusion concerns only the laser and not the overall system.

A1.3 *2D-/3D- Laser scanner for safety functions*

Mechanical parts

Integrated rotating mirror
Rotating movement of the laser head / 2D-Laser scanner

Applicable Directives

- 2006/42/EC (MD)

Rationale

The 2D-/3D-Laser scanner for safety functions is considered to be a **safety component** acc. Directive 2006/42/EC, if it is independently placed on the market, because

- it serves to fulfil a safety function,
- the failure and/or malfunction of which endangers the safety of persons, and
- it is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function (e. g. by a 2D-/3D- Laser scanner not for safety functions).

Therefore **the definition acc. art. 2 c) MD is applicable**.

The 2D-/3D- Laser scanner for safety functions can be assigned to the following examples listed in Annex V (Indicative list of the safety components) of the Machinery Directive:

Nr. 2 Protective devices designed to detect the presence of persons
Nr. 4 Logic units to ensure safety functions

MD Annex IV is applicable

The 2D-/3D- Laser scanner for safety functions can be assigned to the following categories of machinery listed in Annex IV of the Machinery Directive:

19. Protective devices designed to detect the presence of persons
Guide to MD § 388 item 19

Item 19 covers safety components that detect the presence of persons or parts of persons and that generate an appropriate signal to the control system to reduce risks to the persons detected. The signal may be generated when a person or part of a person goes beyond a predetermined limit (tripping), or when a person is detected in a predetermined zone (presence sensing), or both. Such protective devices include, for example:

> active opto-electronic protective devices such as, for example, light curtains, scanning heads, light beam and laser devices.

21. Logic units to ensure safety functions
Guide to MD § 388 item 21

The logic units to ensure safety functions referred to in item 21 are complex components which:

- correspond to the definition of safety components […] and
- analyse one or several input signals and generate, by a given algorithm, one or more output signals and
- are intended to operate in connection with, or as part of, the control system of machinery in order to perform one or more safety functions.

A1.4 *Laser pointer (battery powered, handheld)*

Mechanical parts

None

Applicable Directives

- 2001/95/EC (GPSD)

Rationale

The laser pointer is **not** considered to be **machinery**:

- It consists of linked parts or components,
- at least one of which moves, and
- which are joined together for a specific application.

But

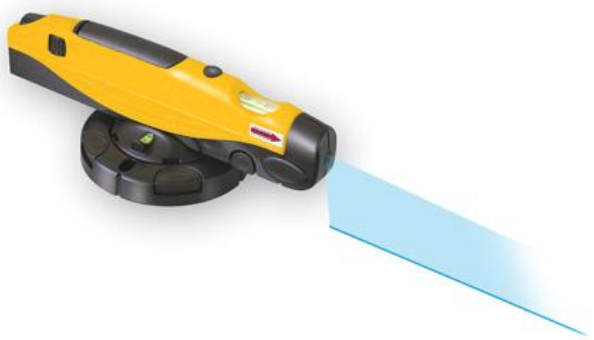
- it is not fitted with a drive system other than directly applied human or animal effort.

Therefore **the definition acc. art. 2 a) MD is not applicable**.

The laser pointer is **not** considered to be **a product according to the Low Voltage Directive** 2014/35/EU, because its electrical supply is outside the voltage limits of the Low Voltage Directive (between 50 and 1000 V for alternating current or between 75 and 1500 V for direct current).

In accordance with the Commission Decision 2014/59/EU on the safety requirements to be met by European standards for consumer laser products pursuant to Directive 2001/95/EC of the European Parliament and of the Council on general product safety there is a widespread consensus that only laser products corresponding to classes 1, 1M, 2 and 2M of the classification put in place by the standard EN 60825-1:2007 can be considered safe when used by consumers.

A1.5 *Laser spirit level (battery powered, without integrated rotating mirror)*



Mechanical parts

None (by using a lens for widening the laser beam)

Applicable directives

- 2001/95/EC (GPSD)

Rationale

The laser spirit level is **not** considered to be **machinery**:

- It consists of linked parts or components,
- at least one of which moves, and
- which are joined together for a specific application.

But

- it is not fitted with a drive system other than directly applied human or animal effort.

Therefore **the definition acc. art. 2 a) MD is not applicable**.

The laser spirit level is not a product according to the Low Voltage Directive 2014/35/EU, because its electrical supply is outside the voltage limits of the Low Voltage Directive (between 50 and 1000 V for alternating current or between 75 and 1500 V for direct current).

In accordance with the Commission Decision 2014/59/EU on the safety requirements to be met by European standards for consumer laser products pursuant to Directive 2001/95/EC of the European Parliament and of the Council on general product safety there is a widespread consensus that only laser products corresponding to classes 1, 1M, 2 and 2M of the classification put in place by the standard EN 60825-1:2007 can be considered safe when used by consumers.

A1.6 *Show and projection laser*

Mechanical parts

Ventilator etc.

Applicable directives

- 2006/42/EC (MD)

Rationale

The show and projection laser is considered to be **machinery**, because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

Therefore **the definition acc. art. 2 a) MD is applicable**.

The **exclusion** acc. art. 1 (2) letter k, Machinery Directive – audio and video equipment is **not** applicable.

Show and projection lasers are not considered to be audio and video equipment, because they do not serve the purpose of recording, processing, reproducing and broadcasting sound and images as for example radio and television receivers, tape and video players and recorders, CD and DVD players and recorders, amplifiers and loud speakers, cameras and projectors.

Show and projection lasers serve the purpose of projecting visible laser radiation on surfaces or objects to produce light effects or light patterns for example in theatre and opera productions, concerts, shows and congresses. Projection lasers are used in industry for marking, without material processing.

This interpretation has been approved at the Machinery Working Group meeting of the EU Commission on 5/6 November 2014 (see:
http://ec.europa.eu/DocsRoom/documents/12524/attachments/1/translations/en/renditions/native).

A1.7 *Laser projector*

Mechanical parts

Ventilator, motorised objective adjustment.

Applicable directives

- 2014/35/EU (LVD)

Rationale

The laser projector is **not** considered to be **machinery**. The definition acc. art. 2 a) MD is applicable, because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

However, the **exclusion** acc. art. 1 (2) letter k, Machinery Directive – audio and video equipment **is applicable**, because laser projectors serve the purpose of recording, processing, reproducing and broadcasting sound and images as for example radio and television receivers, tape and video players and recorders, CD and DVD players and recorders, amplifiers and loud speakers, cameras and projectors.

A1.8 *Laser source*

Mechanical parts

"Turbo fan", ventilators or water pumps

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser source is considered to be **partly completed machinery**, because it is an assembly

- which is almost machinery

but

- which cannot in itself perform a specific application and
- which is intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment.

Therefore **the definition acc. art. 2 g) MD is applicable**.

A1.9 *Laser source with deflection unit*

Mechanical parts

"Turbo fan"
x-scanner / y-scanner

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser source with deflection unit is considered to be **partly completed machinery**, because it is an assembly

- which is almost machinery

but

- which cannot in itself perform a specific application and
- which is intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment.

Therefore **the definition acc. art. 2 g) MD is applicable**.

A1.10 *Laser machine*

Mechanical parts

Multiply existing

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser machine is considered to be **machinery**, because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

Therefore **the definition acc. art. 2 a) MD is applicable**.

A1.11 *Laser machine with fixed laser source for working handheld work pieces*

Mechanical parts

Mechanical parts of the laser source (“turbo fan”, etc.)
Potentially 4-axis movement unit
etc.

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser machine is considered to be **machinery**, because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

Therefore **the definition acc. art. 2 a) MD is applicable**.

A1.12 *Laser machine with hand guided laser head*

Mechanical parts

Mechanical parts of the laser source (“turbo fan”, etc.)

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser machine is considered to be **machinery**, because

- it consists of linked parts or components,
- at least one of which moves,
- which are joined together for a specific application and
- it is fitted with a drive system other than directly applied human or animal effort.

Therefore **the definition acc. art. 2 a) MD is applicable**.

A1.13 *Laser safety cabin (passive), case a)*

Mechanical parts

None

Applicable directives

None

Rationale

The laser safety cabin is intended to protect against laser radiation of a specific machine and is constructed on behalf and according to precise specifications of the manufacturer of the machine. It is assembled with the machine and placed on the market as an assembly by the manufacturer of the machine.

The laser safety cabin is **not independently placed on the market** .

A1.14 *Laser safety cabin (passive), case b)*

Mechanical parts

None

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser safety cabin is designed for a custom-made machine, for which it is intended to protect against laser radiation and **independently placed on the market**.
The laser safety cabin is considered to be a **safety component acc. Directive 2006/42/EC**, because

- it serves to fulfil a safety function,
- the failure and/or malfunction of which endangers the safety of persons, and
- it is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

Therefore **the definition acc. art. 2 c) MD is applicable**.

A1.15 *Laser safety profile for integration in / use with machinery*

Guaranteed characteristics

Laser safety profiles have guaranteed characteristics that describe which thickness of the material of the profile is able to withstand the laser radiation corresponding to the type and duration of the laser radiation.

Mechanical parts

None

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser safety profile is considered to be a **safety component acc. Directive 2006/42/EC**, because

- it serves to fulfil a safety function,
- the failure and/or malfunction of which endangers the safety of persons,
- it is independently placed on the market (manufacturer of the machinery is not the manufacturer of the laser safety profile) and
- it is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

Therefore **the definition acc. art. 2 c) MD is applicable**.

Analogy to safety fences

MD WG-2014.04-EN rev.1, approved at the Machinery Working Group meeting on 5-6 November 2014:
„Safety fences which are designed, constructed and placed on the market separately as complete items by fence manufacturers shall be regarded as Safety Components within the meaning of the Machinery Directive and must therefore bear the CE marking, and an EC Declaration of Conformity (DoC) and User Instructions (in the appropriate language) must be issued and enclosed with them. This also applies to those safety fences placed on the market by a manufacturer independently of any particular machine, split up into their individual parts but as complete items in the manner of a construction kit (system components, modular protective fences) and only assembled at their intended destination."

(http://ec.europa.eu/DocsRoom/documents/9524/attachments/1/translations/en/renditions/native)

Laser safety profiles are individual parts, that are assembled together as construction kit by utilisation of the guaranteed characteristics at the machine. In analogy to safety fences they are regarded as safety components.

A1.16 *Laser safety curtain for use with machinery*

Mechanical parts

None

Applicable directives

- 2006/42/EC (MD)

Rationale

The laser safety curtain is a **safety component acc. Directive 2006/42/EC**, because

- it serves to fulfil a safety function,
- the failure and/or malfunction of which endangers the safety of persons,
- it is independently placed on the market (manufacturer of the machinery is not the manufacturer of the laser safety curtain) and
- it is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

Therefore **the definition acc. art. 2 c) MD is applicable**.

A1.17 *Laser safety wall (active) for use with machinery*

Mechanical parts

None

Applicable directives

- 2006/42/EC (MD)

Rationale

The active laser safety wall is considered to be a **safety component acc. Directive 2006/42/EC**, because

- it serves to fulfil a safety function,
- the failure and/or malfunction of which endangers the safety of persons,
- it is independently placed on the market and
- it is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

Therefore **the definition acc. art. 2 c) MD is applicable**.

MD Annex IV is applicable

The active laser safety wall can be assigned to the following category of machinery listed in Annex IV of the Machinery Directive:

21. Logic units to ensure safety functions
Guide to MD § 388 item 21

The logic units to ensure safety functions referred to in item 21 are complex components which:

- correspond to the definition of safety components […] and
- analyse one or several input signals and generate, by a given algorithm, one or more output signals and
- are intended to operate in connection with, or as part of, the control system of machinery in order to perform one or more safety functions.

A1.18 *Beam deflector with control system and declaration of PL/SIL*

Mechanical parts

None

Applicable directives

- 2006/42/EC (MD)

Rationale

The beam deflector with control system is considered to be a **safety component acc. Directive 2006/42/E**C, because

- it serves to fulfil a safety function,
- the failure and/or malfunction of which endangers the safety of persons,
- it is independently placed on the market and
- it is not necessary in order for the machinery to function, or for which normal components may be substituted in order for the machinery to function.

Therefore **the definition acc. art. 2 c) MD is applicable**.

MD Annex IV is applicable
The beam deflector with control system can be assigned to the following category of machinery listed in Annex IV of the Machinery Directive:

21. Logic units to ensure safety functions
Guide to MD § 388 item 21

The logic units to ensure safety functions referred to in item 21 are complex components which

- correspond to the definition of safety components […] and
- analyse one or several input signals and generate, by a given algorithm, one or more output signals and
- are intended to operate in connection with, or as part of, the control system of machinery in order to perform one or more safety functions.

A2 Literature

Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety
OJ L 11, 15.1.2002, p. 4-17

Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC
OJ L 157, 9.6.2006, p. 24-86

Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
OJ L 96, 29.3.2014, p. 357-374

COMMISSION DECISION of 5 February 2014 on the safety requirements tob e met by European standards for consumer laser products pursuant to Directive 2001/95/EC of the European Parliament and of the Council on general product safety (2014/59/EU)

2nd revised edition October 2015

Marlies Kittelmann, Thomas Mössner, Günter Ott, Erik Romanus | Federal Institute For Occupational Safety and Health (BAuA) | Friedrich-Henkel-Weg 1-25 | D-44149 Dortmund | Tel.: +49 (0) 231 9071-0 | Telefax: +49 (0) 231 9071-2454 | info-zentrum@baua.bund.de | www.baua.de

Martin Brose, Malte Gomolka, Stefan Stommel | Energy Textile Electro Media Products Accident Prevention & Insurance Association (BG ETEM)