

Chapter 2

HARMONIZED EUROPEAN STANDARDS

These standards are common to all EC and EFTA countries and are produced by the European Standardization bodies CEN and CENELEC . Their use is voluntary but designing and manufacturing equipment to them is the most direct way of demonstrating compliance with the EHSRs.

At the time of publication of this book some of the standards are not yet completed but as they become available their titles will be published in the Official Journal of the European Communities. They will have a common prefix of EN. When they are published, existing national standards which have the same scope will be withdrawn.

They are divided into 3 groups: A, B and C STANDARDS.

A STANDARDS - Cover aspects applicable to all types of machines.

B STANDARDS - Subdivided into 2 groups.

B1 STANDARDS - Cover particular safety and ergonomic aspects of machinery.

B2 STANDARDS - Cover safety components and devices.

C STANDARDS - Cover specific types or groups of machines.

It is important to note that complying with a C Standard gives automatic presumption of conformity with the EHSRs. In the absence of a suitable C Standard, A and B Standards can be used as part or full proof of EHSR conformity by pointing to compliance with relevant sections.

Agreements have been reached with other world-wide Standardization Bodies for cooperation between CEN/CENELEC and bodies such as IEC and ISO. This should ultimately result in common world-wide standards.

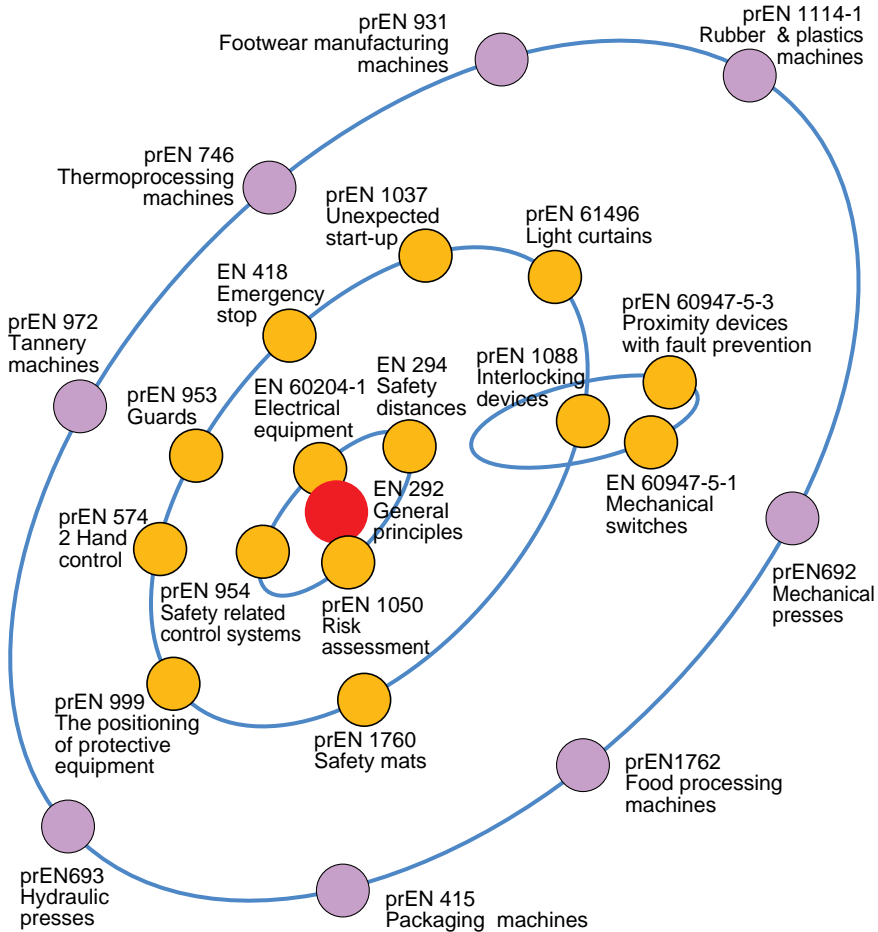


Fig. 12
The diagram above shows the satellite type relationship between some of the various provisional and finalized European Standards (only a small selection of each type are shown).

*The inner orbits comprise A and B Standards
 The outer orbit represents the C Standards. The content of the C Standards is formed under the influence of the A and B Standards.*

The following pages list some of the A and B Standards of relevance to this book. Where they are prefixed EN they are published standards. Where they are prefixed prEN they have not yet reached the final publication stage at the time of printing of this book.

EN 292 pts 1&2 - Safety of machinery - Basic concepts, general principles for design.

Absolute compulsory reading for all. It is an A standard which outlines all the basic principles including risk assessment, guarding, interlocking, emergency stops, trip devices, safety distances etc. (and much more). It references out to the other standards and also includes the essential safety requirements from the Machinery Directive.

EN 60204-1 - Safety of machinery - Electrical equipment of machines - Pt 1 General requirements.

This is a very important standard. It gives general and specific recommendations for safety related aspects of wiring and electrical equipment on machines.

EN 294 - Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs.

Gives data for calculation of safe aperture sizes and positioning for guards etc.

prEN 811 - Safety of machinery - Safety distances to prevent danger zones being reached by the lower limbs.

Gives data for calculation of safe aperture sizes and positioning for guards etc.

prEN 349 - Safety of machinery - Minimum distances to avoid crushing parts of the human body.

Gives data for calculation of safe gaps between moving parts etc.

prEN 1088 - Safety of machinery - Interlocking devices associated with guards - Principles for design and selection.

Gives principles for the design and selection of interlocking devices associated with guards.

In order to verify mechanical switches it refers to **EN 60947-5-1 - Low voltage switchgear - Pt 5: Control circuit devices and switching elements - Section 1: Electromechanical control circuit devices.**

In order to verify non-mechanical switches it refers to **prEN 60947-5-3 - Particular requirements for proximity devices with fault prevention measures or defined behavior under fault conditions.** (Provisional number and title only).

prEN 954 - Safety of machinery - Safety related parts of control systems - Pt 1: General principles for design.

This standard outlines requirements for safety critical parts of machine control systems and describes 5 categories of performance “- B, 1, 2, 3 & 4. It is not certain which number it will eventually carry. In whichever form it is published however it is important to achieve a working knowledge of this document as its categories are becoming accepted as the common “language” for describing the performance of safety related control systems.

prEN 1050 - Safety of machinery - Principles for risk assessment.

Outlines the fundamentals of the process of assessing the risks during the life of the machinery. It summarizes but is not intended to provide a detailed account of methods for analyzing hazards and estimating risks.

prEN 999 - Safety of machinery - The positioning of protective equipment in respect of approach speeds of parts of the human body.

Provides methods for designers to calculate the minimum safety distances from a hazard for specific safety devices. In particular for electro sensitive devices (eg: light curtains), pressure sensitive mats/floors and two-hand controls. It contains a principle for the positioning of safety devices based on approach speed and machine stopping time which can reasonably be extrapolated to cover interlocked guard doors without guard locking.

prEN 574 - Safety of machinery -Two hand control devices - Functional aspects - Principles for design.

Provides requirements and guidance on the design and selection of two hand control devices, including the prevention of defeat and the avoidance of faults.

EN 418 - Safety of machinery - Emergency Stop devices, functional aspects - Principles for design.

Gives design principles and requirements.

prEN 1921 - Industrial Automation Systems - Safety of Integrated Manufacturing Systems - Basic Requirements.

This standard specifies safety requirements where two or more machines are interconnected and operated by a controller capable of being re-programmed

for the manufacture of discrete parts or assemblies. It is based on the International Standard ISO 11161:1994.

prEN 61496-1&2 - Safety of machinery - Electro sensitive protective equipment Pt 1: General requirements and tests.

Pt 2: Particular requirements for equipment using active opto-electronic protective devices.

Part 1 gives requirements and test procedures for the control and monitoring aspects for electro sensitive protective equipment. Subsequent parts deal with aspects particular to the sensing side of the system.

Part 2 gives particular requirements for safety light curtains.

prEN 1760-1 - Safety of machinery - Pressure Sensitive Safety Devices - Pt 1: Mats & Floors. .

Gives requirements and test procedures.

prEN 1760-2 - Safety of machinery - Pressure Sensitive Safety Devices - Pt 2: Edges & Bars.

Gives requirements and test procedures.

prEN 953 - Safety of machinery - General Requirements for the Design and Construction of Guards.

Gives definitions, descriptions and design requirements for fixed and movable guards.

prEN 1037 - Safety of machinery - Isolation and energy dissipation - Prevention of unexpected start-up.

Defines measures aimed at isolating machines from power supplies and dissipating stored energy to prevent unexpected machine start-up and allow safe intervention in danger zones.