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Machine Safeguarding Specification

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1. PURPOSE AND SUMMARY

The purpose of this specification is to improve workplace safety by adequately protecting personnel from hazards associated with powered industrial machinery. The specification serves as a guide for the minimum design requirements for safeguarding industrial machinery. Appropriate safeguards must be designed and constructed for each machine to prevent personnel from having any part of their body in the danger zone of the machine during hazardous phases of the machine cycle, including those in which releases of hazardous energy may occur.

Machine related hazards include, but are not limited to, rotating, meshing, sliding, clamping, impact from machine components or materials, electrical shock, or contacting hot surfaces. This also includes the hazardous ejection or release of parts, pieces, or chips from the machine, as well as ionizing and non-ionizing energies, e.g. excessive sound, light, radiated energy, etc.

The goals of this specification are:

- Ensure compliance with applicable machine safety codes/standards.
- Eliminate or reduce risk presented by the machine to within tolerable levels.
- Establish a specification to which new machines are built and existing machines may be upgraded, subject to plans and priorities established by the company.

This specification does not apply to construction equipment, portable tools, or manually operated (non-powered) tools.

Throughout this document “Company” refers to **client**. “Contractor”, “Vendor” or “Integrator” refers to parties that supply products or services to the Company.

2. APPLICABLE U.S. STANDARDS AND REGULATIONS

The design of the machine safeguarding system shall comply with the latest version of the following United States (U.S.) standards.

U.S. Standards

Regulation / Standard	Title
OSHA 29 CFR 1910, Subpart O, in its entirety	OSHA Requirements
OHSA 1910.217(f)(4), Table O-10	OSHA Guard Openings and Distances
ANSI B11.0-2015	Safety of Machinery
ANSI B11.19-2010	Performance Requirements for Safeguarding
ANSI B65-1:2011	Graphic Technology - Safety Requirements for Graphic Technology Equipment and Systems - Part 1: General Requirements *(Guidance for guarding in-running nip points in this standard shall apply to all machines.)*
ANSI/RIA R15.06-2012	American National Standard for Industrial Robots and Robot Systems- Safety Requirements
RIA TR R15.306-2016	Task-based Risk Assessment Methodology
RIA TR R15.606-2016	Robots & Robotic Devices – Collaborative Robots
ANSI Z535.4-2011	Product Safety Signs and Labels
NFPA 79	Electrical Standard for Industrial Machinery

Other machine specific (“vertical”) standards may be applied as applicable.

The design of the machine safeguarding system shall also comply with the latest version of the following ISO standards.

BS EN ISO IEC Standards

Regulation / Standard	Title
DIN EN ISO 7010:2012	Graphical Symbols - Safety Colours And Safety Signs
EN 415-4	Safety of packaging machines. Palletizers and depalletizers.
BS EN ISO 13857:2008	Safety of machinery -- Safety distances to prevent hazard zones being reached by upper and lower limbs
BS EN ISO 14120:2015	Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards

Regulation / Standard	Title
EN ISO 12100	Safety of machinery. Basic concepts, general principles for design. Pts 1 & 2
IEC 60204-1 Ed. 6.0 b:2016	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
IEC/EN 61496	Electro-sensitive protective equipment Pt 1: General requirements and tests.
IEC/EN 61508	Functional safety of electrical, electronic and programmable electronic safety-related systems.
IEC 62061:2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
ISO 10218-1:2011	Robots and Robotic Devices - Safety Requirements for Industrial Robots - Part 1: Robots
ISO 10218-2:2011	Robots and Robotic Devices - Safety Requirements for Industrial Robots - Part 2: Robot Systems and Integration
ISO 11161	Safety of Integrated Manufacturing Systems – Basic Requirements
ISO 12643-1:2009	Graphic technology -- Safety requirements for graphic technology equipment and systems -- Part 1: General requirements. *(Guidance for guarding in-running nip points in this standard shall apply to all machines.)*
ISO 13849-1:2015	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
ISO 13849-2:2012	Safety of machinery -- Safety-related parts of control systems -- Part 2: Validation
ISO 13850 (EN 418)	Emergency Stop devices, functional aspects—Principles for design.
ISO 13851 (EN 574)	Two-hand control devices—Functional aspects—Principles for design.
ISO 13852 (EN 294)	Safety distances to prevent danger zones being reached by the upper limbs.
ISO 13853 (EN 811)	Safety distances to prevent danger zones being reached by the lower limbs.
ISO 13854 (EN 349)	Minimum distances to avoid crushing parts of the human body.

Regulation / Standard	Title
ISO 13855:2010	Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body
ISO 13856-1 (EN 1760-1)	Pressure Sensitive Safety Devices—Pt 1: Mats & Floors.
ISO 13856-2 (EN 1760-2)	Pressure Sensitive Safety Devices—Pt 2: Edges & Bars.
ISO/TS 19837:2018	Safety of machinery — Trapped key interlocking devices — Principles for design and selection
ISO 14118 (EN 1037)	Isolation and energy dissipation—Prevention of unexpected start-up.
ISO 14119 (EN 1088)	Interlocking devices associated with guards—Principles for design and selection.
ISO 14120 (EN 953)	General Requirements for the Design and Construction of Guards.
ISO 14121	Principles of Risk Assessment
ISO/TC 48	Laboratory equipment

In addition to above, standards referenced by the above standards apply. Other machine specific standards may be applied as applicable.

Harmonization Note:

All of the above listed standards (OSHA, ANSI and EN ISO, IEC, etc.) and any references shall apply to new and upgraded machines. In the event of a conflict between standards, the most stringent (highest level of safety) requirements shall be applied.