

## 2017 National Robot Safety Conference - Standards Terms, Abbreviations, Codes & Titles

Standards Group	Designation Code, Term, or Abbreviation	Short Version	Title or Definition
<b>ANSI STANDARDS &amp; SUPPLEMENTAL DOCUMENTS</b>			
ANSI	B11	B11	B11, Safety of Machinery (Family of standards); managed by B11 Standards, Inc.
ANSI	ANSI B11.0-2015	B11.0	Safety of Machines: General requirements and risk assessment
ANSI	ANSI B11.19-2010	B11.19	Performance Criteria for Safeguarding
ANSI	ANSI B11.20-2017	B11.20	Safety Requirements for Integrated Manufacturing Systems [abbreviated IMS]
ANSI	B56	B56	Industrial Truck Safety Standards (Family of standards); managed by ITSDF
ANSI	ANSI/ITSDF B56.5-2012	B56.5	Safety Standard for Driverless, Automatic Guided Industrial Vehicles and Automated Functions of Manned Industrial Vehicles [AGV Safety Standard]
ANSI	ANSI/PMMI B155.1-2016	B155.1	Safety Requirements for Packaging Machinery and Packaging-Related Converting Machinery
ANSI	R15	R15	Robot Safety Standards (Family of standards); managed by RIA
ANSI	ANSI/RIA R15.06-2012	R15.06	American National Standard for Industrial Robots and Robot Systems - Safety Requirements [U.S. National Adoption of ISO 10218-1,2:2011]
ANSI	ANSI/RIA R15.08-201X	R15.08	American National Standard for Industrial Mobile Robots and Robot Systems - Safety Requirements [in development]
ANSI	RIA TR R15.306-2016	TR 306	[Technical Report for Industrial Robots and Robot systems -- Safety Requirements -- ] Task-based Risk Assessment Methodology
ANSI	RIA TR R15.406-2014	TR 406	[Technical Report for Industrial Robots and Robot systems -- Safety Requirements -- ] Safeguarding
ANSI	RIA TR R15.506-2014	TR 506	[Technical Report for Industrial Robots and Robot systems -- Safety Requirements -- ] Applicability of ANSI/RIA R15.06-2012 for Existing Industrial Robot Applications
ANSI	RIA TR R15.606-2016	TR 606	[Technical Report for Industrial Robots and Robot systems -- Safety Requirements -- ] Collaborative Robots [U.S. National Adoption of ISO/TS 15066:2016]
ANSI	ANSI/ASSE Z244.1-2016	Z244.1	Control of Hazardous Energy – Lockout, Tagout and Alternative Methods
<b>CSA (Canadian) STANDARDS</b>			
CSA	CAN/CSA Z434-14	Z434	Industrial robots and robot systems [Canadian adoption of ISO 10218-1,2, 2011, with Canadian deviations]
CSA	CSA Z432-16	Z432	Safeguarding of machinery
CSA	CSA Z460-13	Z460	Control of Hazardous Energy – Lockout and Other Methods
<b>EN STANDARDS</b>			
EN	EN 1525:1997	1525	Safety of industrial trucks - Driverless trucks and their systems [published in 1997; remains current edition]
EN	EN 1526:1997	1526	Safety of industrial trucks - Additional requirements for automated functions on trucks
<b>IEC STANDARDS</b>			
IEC	IEC 60204-1:2016	60204	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
IEC	IEC 61508:2010	61508	Functional safety of electrical/ electronic/ programmable electronic safety-related systems. Part 1 contains General Requirements; there are additional Parts 2 - 7.
IEC	IEC 62061-1:2005	62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
<b>ISO STANDARDS &amp; SUPPLEMENTAL DOCUMENTS</b>			
ISO	ISO 3691-4	3691-4	Industrial trucks -- Safety requirements and verification -- Part 4: Driverless industrial trucks and their systems [in development]
ISO	ISO 8373:2012	8373	Robots and robotic devices -- Vocabulary
ISO	ISO 10218-1:2011	Part 1	Robots and robotic devices -- Safety requirements for industrial robots -- Part 1: Robots
ISO	ISO 10218-2:2011	Part 2	Robots and robotic devices -- Safety requirements for industrial robots -- Part 2: Robot systems and integration
ISO	ISO 11161:2007	11161	Safety of machinery -- Integrated manufacturing systems -- Basic requirements [Reviewed and confirmed in 2015; this version remains current]
ISO	ISO 12100:2010	12100	Safety of machinery - General principles for design -- Risk assessment and risk reduction
ISO	ISO 13482:2014	13482	Robots and robotic devices -- Safety requirements for personal care robots
ISO	ISO 13849-1:2015	13849	Safety of machinery - Safety-related parts of control systems -- Part 1: General principles for design [abbreviated SRP/CS]
ISO	ISO 13849-2:2012	13849	Safety of machinery - Safety-related parts of control systems -- Part 2: Validation
ISO	ISO 13850:2015	13850	Safety of machinery - Emergency stop function -- Principles for design
ISO	ISO 14118:2000	14118	Safety of machinery - Prevention of unexpected start-up
ISO	ISO 14119:2013	14119	Safety of machinery - Interlocking devices associated with guards -- Principles for design and selection
ISO	ISO 14120:2015	14120	Safety of machinery -- Guards -- General requirements for the design and construction of fixed and movable guards
ISO	ISO/TS 15066:2016	15066	[Technical Specification] Robots and Robotic devices -- Collaborative Robots
ISO	ISO/TR 20218-1:201X	End-Effectors	[Technical Report] Robotics -- Safety Design for industrial robot systems -- Part 1: End-effector(s) [under ballot] [Note: "End-Effector" also known as "End-of-arm-tooling" or "EOAT".]
ISO	ISO/TR 20218-2:2017	MLUS	[Technical Report] Robotics -- Safety Design for industrial robot systems -- Part 2: Manual Load/ Unload Stations [approved for publication]
<b>NFPA STANDARDS</b>			
NFPA	NFPA 79-2015	NFPA 79	Electrical Standard for Industrial Machinery
<b>UL STANDARDS</b>			
UL	UL STP 1740-2007	UL 1740	Standard for Robots and Robotic Equipment

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Standards Group	Designation Code, Term, or Abbreviation	Short Version	Title or Definition
<b>STANDARDS ORGANIZATIONS, COMMITTEES &amp; CONCEPTS</b>			
ANSI	ANSI	ANSI	American National Standards Institute; National Standards Body (NSB) for the U.S.
ANSI	ASSE	ASSE	American Society of Safety Engineers; SDO
ANSI	B11 Standards, Inc.	B11	B11 Standards, Inc.; SDO
ANSI	ITSDF	ITSDF	Industrial Truck Standards Development Foundation; SDO
ANSI	MHI	MHI	Materials Handling Institute; SDO
ANSI	NFPA	NFPA	National Fire Protection Association; SDO
ANSI	PMMI	PMMI	Packaging Machinery Manufacturers Institute; SDO
ANSI	R15 SAC	SAC	R15 Standards Approval Committee overseeing the development and revision of R15.06 and R15.08 and related TRs
ANSI	R15.06	R15.06	R15.06 Drafting Subcommittee on Industrial Robot Safety
ANSI	R15.08	R15.08	R15.08 Drafting Subcommittee on Industrial Mobile Robot Safety
ANSI	RIA	RIA	Robotic Industries Association; SDO
ANSI	SDO	SDO	Standards Developing Organization working in the ANSI framework; e.g. B11, ITSDF, RIA, etc.
ANSI	UL, LLC	UL	Underwriters Laboratories; SDO, research, and certification organization
ANSI	U.S. National Adoption		The adoption of a published international standard as U.S. National Standard under the ANSI framework; content may be unchanged from the original (except for minor spelling and formatting edits), or content may be modified (must be so marked).
ANSI	U.S. TAG to ISO TC 299	U.S. TAG	U.S. Technical Advisory Group to ISO Technical Committee 299, Robotics
EEC	Machinery Directive	MD	European Machinery Directive, Directive 2006/42/EC; intended to ensure a common safety level of machinery placed on the market or put in service in all member states.
EN	EN	EN	European standards (ENs) are documents that have been ratified by one of the three European Standardization Organizations (ESOs): CEN, CENELEC, or ETSI.
ESO	ESO	ESO	European Standardization Organizations, i.e., CEN, CENELEC, ETSI.
IEC	IEC	IEC	International Electrotechnical Commission
ISO	ISO	ISO	International Organization for Standardization
ISO	NSB	NSB	National Standards Bodies (e.g., ANSI, BSI, CSA, DIN, JISC, etc.); the official members of ISO for their respective countries
ISO	ISO TC 184	TC 184	ISO Technical Committee 184, Automation systems and integration
ISO	ISO TC 199	TC 199	ISO Technical Committee 199, Safety of Machinery
ISO	ISO TC 299	TC 299	ISO Technical Committee 299, Robotics
ISO	ISO TC 299/ WG 1	WG 1	ISO Technical Committee 299, Robotics, Working Group 1, Vocabulary and Characteristics
ISO	ISO TC 299/ WG 2	WG 2	ISO Technical Committee 299, Robotics, Working Group 2, Personal Care Robot Safety
ISO	ISO TC 299/ WG 3	WG 3	ISO Technical Committee 299, Robotics, Working Group 3, Industrial Safety
ISO	ISO TC 299/ WG 4	WG 4	ISO Technical Committee 299, Robotics, Working Group 4, Service Robots
ISO	ISO TC 299/ JWG 5	JWG 5	ISO Technical Committee 299, Robotics, Joint Working Group 5, Medical Robot Safety
ISO	ISO TC 299/ WG 6	WG 6	ISO Technical Committee 299, Robotics, Working Group 6, Modularity for Service Robots
[multiple]	Functional Safety	FS	Functional Safety is the aspect or part of an overall safety system that depends on the system or equipment responding correctly to inputs. Relies on the correct detection of a potentially dangerous condition, and correct execution of active system(s) to mitigate the risk.
NIOSH	NIOSH	NIOSH	National Institute for Occupational Safety and Health (U.S.) - Research body; part of HHS/CDC
NIST	NIST	NIST	National Institute of Standards and Technology (U.S.) - Research body; part of DOC
OSHA	OSHA	OSHA	Occupational Safety and Health Administration (U.S.) - Regulatory body; part of DOL
SCC	SCC	SCC	Standards Council of Canada; National Standards Body [NSB] for Canada
SCC	CSA Group	CSA	Canadian Standards Association; an SDO, testing, and certification body of Canada; accredited by SCC
Type A	Basic Safety Standards	Type A	Basic Safety Standards, addressing general principles for safety of machines. Examples: ISO 12100; ANSI B11.0. [Note: The concept of Type A, B, and C standards originated in Europe and is strictly enforced there; some ANSI SDOs have chosen to follow a similar structure but it is not required in the U.S.]
Type B	Generic Safety Standards	Type B	Generic Safety Standards, addressing certain aspects of safeguarding across a sub-set or range of machinery types. Examples: ISO 13849; ANSI B11.19
Type B1	Generic Standards for Safety Aspects	Type B1	Generic Safety Standards, covering general safety aspects; e.g., noise levels, safe distances, etc. Example: ISO 13849.
Type B2	Generic Standards for Systems & Safeguards	Type B2	Generic Safety Standards, covering systems and safeguards; e.g., two-hand controls, interlocking devices, guards, etc. Example: ANSI B11.19.
Type C	Specialist Standards	Type C	Specialist Safety Standards, addressing specific safety requirements for particular machinery groups; e.g., robots, elevators, etc. All included requirements are specific to that type of machine. If a conflict exists between the Type-C and Type-B standard, typically the Type-C standard prevails. Examples: ANSI R15.06, ISO 10218.
<b>U.S. LEGISLATION and REGULATIONS (selected)</b>			
OSH Act	OSH Act of 1970	OSH Act	U.S. Occupational Safety and Health Act of 1970 [authorizing the creation of OSHA and NIOSH]
OSH Act	"Section 5" of the OSH Act	General Duty Clause	OSH Act of 1970, Sec. 5; Responsibility of an employer to provide a place of employment free from serious recognized hazards, and to comply with the standards [regulations] promulgated under this act.
OSHA	OSHA 29 CFR §1910	1910	General Industry Health and Safety Regulations
OSHA	OSHA 29 CFR §1910.147	1910.147	Occupational Safety and Health Standards -- Control of hazardous energy (lockout/tagout)
OSHA	OSHA 29 CFR §1910.212	1910.212	Occupational Safety and Health Standards -- General Requirements for all Machines
OSHA	OSHA 29 CFR §1910.219	1910.219	Occupational Safety and Health Standards -- Mechanical power-transmission apparatus