

Type	Safety Function	Advantages	Limitations	Requirements	Standards
<i>Guards: protective physical barrier used to prevent access.</i>					
Fixed Guard 	Provides a fixed barrier to the hazard	<ul style="list-style-type: none"> • Low maintenance • Long life • Low cost for small areas • Protects all individuals • Can contain ejected materials 	<ul style="list-style-type: none"> • Poor ergonomics • Limited visibility • Limited access • Costly for large areas • Maintenance may require removal of guard 	<ul style="list-style-type: none"> • Protect from identified hazard • User should not be able to reach over, under, around or through the barrier • Provide safe openings 	<ul style="list-style-type: none"> • ANSI B11.19 • ISO 14120 • ISO 13852 • ISO 13853 • ASME B15.1
Interlocked Guard 	Interrupts power to machine when guard is opened	<ul style="list-style-type: none"> • Low initial investment • Can be placed close to hazard • Protects all individuals • Can contain ejected materials 	<ul style="list-style-type: none"> • Costly for large areas • Increased maintenance 	<ul style="list-style-type: none"> • Must not be easy to defeat • Guard may open only after machine has stopped– or must be installed at a safe distance 	<ul style="list-style-type: none"> • ANSI B11.19 • NFPA 79 • ISO 14119 • IEC 60204-1
<i>Safeguarding Devices: components, attachments or mechanisms designed to perform a specific safeguarding function.</i>					
Safety Light Screen 	Arrests power to machine when sensing field is interrupted	<ul style="list-style-type: none"> • Excellent ergonomics • Allows frequent access • Protects all individuals • Cost effective for large areas • Allows for good visibility 	<ul style="list-style-type: none"> • Limited to machines that can be stopped quickly • No protection from ejected parts • May require the use of additional guards • May create a pass-through hazard 	<ul style="list-style-type: none"> • Initiate immediate stop when sensing field is interrupted • Appropriate resolution required to detect objects the size of a torso, ankle, hand or finger 	<ul style="list-style-type: none"> • ANSI B11.19 • IEC 61496 • ISO 13855
Multiple-Beam System: • Grids • Points 	Arrests power to machine when sensing field is interrupted	<ul style="list-style-type: none"> • Low initial investment • Allows frequent access • Allows for good visibility • Protects all individuals 	<ul style="list-style-type: none"> • Limited to machines that can be stopped quickly • No protection from ejected parts • Large safety distance • May create a pass-through hazard 	<ul style="list-style-type: none"> • Initiate immediate stop when sensing field is interrupted • Appropriate resolution required to detect objects the size of a torso 	<ul style="list-style-type: none"> • ANSI B11.19 • IEC 61496 • ISO 13855
Two-Hand Control 	Operator must use both hands to actuate machine motion thereby preventing operator access to hazardous area	<ul style="list-style-type: none"> • Operator's hands are away from hazardous area • Low initial investment • Low maintenance 	<ul style="list-style-type: none"> • Potential ergonomic impact • Provides protection only for operator • No protection from ejected parts 	<ul style="list-style-type: none"> • Concurrent actuation • Release and reactivation required before machine motion may be reinitiated 	<ul style="list-style-type: none"> • ANSI B11.19 • NFPA 79 • ISO 13855 • ISO 13856 • IEC 60204-1
Safety Mat Monitor 	Interrupts power to machine when a minimum pressure is applied	<ul style="list-style-type: none"> • Excellent ergonomics • Protects all individuals • Allows for good visibility 	<ul style="list-style-type: none"> • Costly for large areas • Maintenance intensive • Large safety distance 	Minimum object sensitivity of 66 lbs on and 3-1/8" surface to detect a foot	<ul style="list-style-type: none"> • ANSI B11.19 • ISO 13855 • ISO 13856
<i>Complementary Safety Devices: used to supplement a primary safeguard.</i>					
E-Stop • Button • Rope-Pull 	Operator activates button in emergency situation to shut off power to machine	<ul style="list-style-type: none"> • Immediate response • Safe shutdown of machine process 	<ul style="list-style-type: none"> • Not considered a safeguard • Requires conscious act of operator • Limits injury or machine damage but typically does not prevent it 	<ul style="list-style-type: none"> • Overrides all other functions and operations • Reset of E-stop doesn't initiate machine motion • Button must be red with yellow background • Should be located at each operation station • Final removal of power done by electromechanical components 	<ul style="list-style-type: none"> • ANSI B11.19 • NFPA 79 • ISO 12100 • IEC 60204-1 • ISO 13850

*Partial list