



SHAPA TECHNICAL PAPER

Comparison of the New and Old Machinery Directives

2006/42/EC and 98/37/EC



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EHSR	Heading	Changes in 2006/42/EC
	Scope	Explicitly included: <ul style="list-style-type: none"> • Lifting accessories • Chains, ropes and webbing • Removable mechanical transmission devices • Partly completed machinery • Construction site hoists
	Scope	New exclusion: Machinery specially designed and constructed for research purposes for temporary use in laboratories
	Scope	Covered by Low Voltage Directive <ul style="list-style-type: none"> • Household appliances for domestic use • Audio and video equipment • Information technology equipment • Ordinary office machinery • Low-voltage switchgear and control gear • Electric motors All other machines are now covered by the Machinery Directive
	Definition of machinery	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
	Definition of partially complete machine	An assembly which is almost machinery but which cannot in itself perform a specific application. A drive system is partly completed machinery. 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
Annex I	General Principles	Explicit requirement to carry out risk assessment that is now in line with EN ISO 14121-1
1.1.1	Definitions	New definitions which derive from EN ISO 12100-1
1.1.2	Principles of Safety Integration	Clearer explanation of “ <i>reasonably foreseeable misuse</i> ” and the “phases of life” to be dealt with, Ergonomic issues transferred to EHSR 1.1.6
1.1.3	Materials and Products	No change
1.1.4	Lighting	Now incorporates EHSR 3.1.2 for mobile machinery
1.1.5	Design of machinery to facilitate its	Now incorporates EHSR 3.1.3 for mobile machinery



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	handling	
1.1.6	Ergonomics	Combines EHSR 1.1.2.d. (<i>"principles of safety integration"</i>) and 1.2.8.: <i>"Software"</i> .
1.1.7	Operating positions	New EHSR which combines EHSR 3.2.1 for mobile machinery and EHSR 4.2.1.1 for lifting machinery.
1.1.8	Seating	New EHSR which incorporates elements from the previous EHSR 3.2.2 and EHSR 3.2.3 for mobile machinery and EHSR 4.2.1.2 for lifting machinery.
1.2	Control Systems	Change in heading from "Controls"
1.2.1	Safety and reliability of control systems	Combines the requirements of the previous EHSR 1.2.1 <i>"Safety and reliability of control systems"</i> and 1.2.7 <i>"Failure of the control circuit"</i> . New clauses <ul style="list-style-type: none"> ■ <i>"reasonably foreseeable human error during operation does not lead to hazardous situations"</i>. ■ <i>"The parameters of the machinery must not change in an uncontrolled way,</i> ■ <i>"The safety-related parts of the control system must apply in a coherent way to the whole of an assembly of machinery and/or partly completed machinery"</i>. ■ <i>"For cable-less control, an automatic stop must be activated when correct control signals are not received, including loss of communication"</i>.
1.2.2	Control	<ul style="list-style-type: none"> ■ Preference for pictograms ■ New measures to protect people in danger zones ■ New measures for machines with more than one control position including a clause from EHSR 3.2.1
1.2.3	Starting	<ul style="list-style-type: none"> ■ <i>"If safety requires that starting and/or stopping must be performed in a specific sequence, there must be devices which ensure that these operations are performed in the correct order"</i>.
1.2.4	Stopping	Heading changed from "stopping device" and sub-clauses created.
1.2.4.1	Normal stop	The effect of the devices for normal stop is now expressed in terms of "functions" (previously in terms of "moving parts").
1.2.4.2	Operational stop	New EHSR <i>"Where, for operational reasons, a stop control that does not cut off the energy supply to the actuators is</i>

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		<i>required, the stop condition must be monitored and maintained</i> .
1.2.4.3	Emergency stop	<p><i>“The emergency stop function must be available and operational at all times, regardless of the operating mode”.</i></p> <p><i>“Emergency stop devices must be a back-up to other safeguarding measures and not a substitute for them”.</i></p>
1.2.4.4	Assembly of machinery	Change of heading from “Complex installations”: No other changes
1.2.5	Selection of control or operating modes	Change of heading from “ <i>Mode selection</i> ” EHSR reordered but its effect has not changed.
1.2.6	Failure of Power Supply	Additional sentence: <i>“the parameters of the machinery must not change in an uncontrolled way when such change can lead to hazardous situations”.</i>
(1.2.7)	(Failure of Control System)	Now incorporated in EHSR1.2.1
(1.2.8)	(Software)	Now incorporated in EHSR 1.1.6
1.3	Protection against mechanical hazards	Heading unchanged
1.3.1	Risk of loss of stability	New heading and explicit extension of the requirement to the different “phases of life” of the machinery:
1.3.2	Risk of break up during operation	No changes
1.3.3	Risks due to falling or ejected objects	No changes
1.3.4	Risks due to surfaces, edges or angles	No changes
1.3.5	Risks related to combined machinery	No changes
1.3.6	Risks related to variations in operating conditions	New heading but requirement unchanged
1.3.7	Risks related to moving parts	No changes
1.3.8	Choice of protection against risks arising from moving parts	The terminology for guards is now in line with EN ISO 12100-1. New requirement “Interlocking movable guards should be used where frequent access is envisaged.”
1.3.9	Risks of uncontrolled movements	New EHSR “When a part of the machinery has been stopped, any drift away from the stopping position, for whatever reason other than action on the control devices, must be prevented or must be such that it does not present a hazard.”

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1.4	Required characteristics of guards and protective devices	Heading unchanged
1.4.1	General requirements	EHSR made much clearer and the following new requirements: <ul style="list-style-type: none"> ■ “guards and protective devices must “be securely held in place”: ■ “where possible, guards must protect against the ejection or falling of materials and objects”: ■ “where possible, guards must protect against emissions generated by the machinery”.
1.4.2.1	Fixed Guards	New requirement “ <i>Their fixing systems must remain attached to the guards or to the machinery when the guards are removed</i> ”.
1.4.2.2	Interlocking movable guards	Heading changed and structure brought into line with EN ISO 12100-1 and made clearer.
1.4.2.3	Adjustable guards restricting access	No significant changes
1.4.2.4	Special requirements for protective devices	No significant changes
1.5	Risks due to other hazards	Heading unchanged
1.5.1	Electricity Supply	Explicit reference to the Low Voltage Directive, “ <i>The safety objectives set out in Directive 73/23/EEC shall apply to machinery. However, the obligations concerning conformity assessment and the placing on the market and/or putting into service of machinery with regard to electrical hazards are governed solely by this Directive.</i> ”
1.5.2	Static Electricity	No changes
1.5.3	Energy supply other than electricity	No changes
1.5.4	Errors of fitting	No changes
1.5.5	Extreme temperatures	No changes
1.5.6	Fire	No changes
1.5.7	Explosion	Requirements simplified and a reference to the ATEX Directive included.
1.5.8	Noise	Additional text “ <i>The level of noise emission may be assessed with reference to comparative emission data for similar machinery</i> ”.
1.5.9	Vibrations	Additional text: “ <i>The level of vibration emission may be assessed with reference to comparative emission</i> ”

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		<i>data for similar machinery</i> ".
1.5.10	Radiation	Restructured to make a clear distinction between functional and undesirable radiation and with different requirements for ionising and non-ionising radiation.
1.5.11	External radiation	No changes
1.5.12	Laser radiation	No significant changes
1.5.13	Emissions of hazardous materials and substances	New heading and <i>more</i> detailed requirements including EHSR 3.5.3 for mobile machinery.
1.5.14	Risk of being trapped in a machine	No changes
1.5.15	Risk of slipping, tripping or falling	New requirement: " <i>Where appropriate, these parts must be fitted with handholds that are fixed relative to the user and that enable them to maintain their stability</i> ".
1.5.16.	Lightning	New EHSR " <i>Machinery in need of protection against the effects of lightning while being used must be fitted with a system for conducting the resultant electrical charge to earth.</i> "
1.6	Maintenance	Heading unchanged
1.6.1	Machinery maintenance	No significant changes
1.6.2	Access to operating position and servicing points	New wording: " <i>Machinery must be designed and constructed in such a way as to allow access in safety to all areas where intervention is necessary during operation, adjustment and maintenance of the machinery.</i> "
1.6.3	Isolation of energy sources	No significant changes
1.6.4	Operator intervention	No significant changes
	Cleaning of internal parts	No significant changes
1.7	Information	New heading was "Indicators"
1.7.1	Information and warnings on the machine	This EHSR combines the requirements of the old 1.7.0 and 1.7.1 and elements of the old 1.7.2 a 1.2.8 but with no additional requirements.
1.7.2	Warning of residual risks	No significant changes
1.7.3	Marking of machinery	Minor changes to improve clarity and the following addition: " <i>It is prohibited to pre-date or post-date the machinery when affixing the CE marking.</i> "
1.7.4	Instructions	This EHSR has been significantly restructured
1.7.4.1	General principles for the drafting of instructions	New requirements: <i>f</i> " <i>The words 'Original instructions' must appear on the language version(s) verified by the manufacturer or his authorised representative.</i> "

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		<ul style="list-style-type: none"> ■ <i>“The translations must bear the words ‘Translation of the original instructions’.</i> ■ <i>“In the case of machinery intended for use by non-professional operators, the wording and layout of the instructions for use must take into account the level of general education and acumen that can reasonably be expected from such operators”.</i>
1.7.4.2	Contents of the instructions	<p>This EHSR is now in line with EN ISO 12100-2. The threshold for providing an A-weighted sound power level measurement is 80dBA rather than 85dBA.</p> <p><i>“Whenever sound emission values are indicated the uncertainties surrounding these values must be specified.”</i></p>
1.7.4.3	Sales literature	<p>This has the same intent as the old EHSR 1.7.4.d) but is now clearer.</p>
2.1	Foodstuffs machinery and machinery for cosmetics and pharmaceutical products	<p>This EHSR has been restructured, but the only significant change is the extension of scope to include machines used for cosmetics and pharmaceutical products.</p>
2.2	Portable hand-held and /or hand-guided machinery	<p>Amendments to 3 EHSRs</p>
2.2.1	General	<p>Design of handles to make <i>“starting and stopping straightforward”</i>.</p>
2.2.1.1	Instructions	<p>Statement of <i>“vibration total value”</i> and <i>“the uncertainty of measurement”</i>. New rules for measurement methods.</p>
2.2.2	Portable fixing and other impact machinery	<p>General requirements for portable fixing and other impact machinery and specific requirements for cartridge operated portable fixing and other impact machinery.</p>
2.3	Machinery for working wood and material with similar physical characteristics	<p>The requirement in b) made more general <i>“the risk of ejection of work pieces and parts of them”</i>.</p>
3	Supplementary EHSR to offset hazards due to mobility	<p>Amendments to 11 EHSRs</p>
3.2.2.	Seating	<p>Revision to include all restraint and protection systems e.g. FOPS, TOPS and ROPS. ROPS, <i>“restraint system”</i> not required if it <i>“increases the risk”</i>.</p>
3.3	Control systems	<p>New title, introduction and addition of general requirements for remote control.</p>
3.3.1	Control devices	<p>Acoustic and/or visual warning signals if the operator can not observe persons in the danger zone when reversing.</p>

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3.3.3	Travelling function	More detailed requirements concerning remote control.
3.4.3	Roll-over and tip-over	Extension of the scope to include “tipping over”. ROPS and TOPS are now a requirement, not just anchorage points.
3.4.4.	Falling objects	FOPS now required and also required to protect people in general not just the operator
3.4.7.	Transmission of power between self-propelled machinery (or tractor) and recipient machinery	Requirement to be able to open the guard of the driving device.
3.5.3	Emissions of hazardous substances	Revised where the main function of the machinery is the spraying of products, to require protecting the operator against the emissions.
3.6.1	Signs, signals and warnings	Additional requirement “where necessary, there must be an appropriate connection between a trailer and the machinery for the operation of signals”.
3.6.3.	Instructions	New title, previously “Instruction handbook”
3.6.3.1	Vibrations	Separate EHSR. Requirement to provide “ <i>the vibration total value</i> ”, “ <i>the highest root mean square value of weighted acceleration to which the whole body is subjected</i> ” and “ <i>the uncertainty of measurement</i> ”.
4	Supplementary EHSR to offset hazards due to lifting operations	Amendments to ? EHSRs.
4.1.1	Definitions	New definitions for “ <i>Lifting operation</i> ” and “ <i>Carrier</i> ”
4.1.2.8	Machinery serving fixed landings	New requirements for construction site hoists and slow moving lifts.
4.1.3	Fitness for purpose	Was 4.2.4, now applicable to all lifting machinery. “ <i>The static and dynamic tests ... must be performed on all lifting machinery ready to be put into service</i> ”.
4.3.3	Lifting machinery	The term “ <i>nominal load</i> ” has been changed into “ <i>working load</i> ”.
4.4.1	Lifting accessories	The instructions must give “ <i>the static test coefficient used</i> ”.
4.4.2	Lifting machinery	Revised as 4.3.3. Instructions must include a record of the fitness for purpose testing.
5	Supplementary EHSRs for machinery intended for underground work	5.3. “Lighting” has been deleted so EHSR 1.1.4 applies.
6	Supplementary EHSR for machinery	Revisions to 10 EHSRs.

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	presenting particular hazards due to the lifting of persons	
6.1.1	Mechanical strength	Previously “6.1.2” with new requirements: <ul style="list-style-type: none"> ■ Strength of the floor requirement extended to the complete “<i>carrier, including any trapdoors</i>”. ■ Additional requirements for “<i>suspension or supporting system</i>”. ■ At least two independent ropes or chains, each with their own anchorage now required.
6.2	Control devices	Hold-to-run control devices no longer required “ <i>where the carrier itself is completely enclosed</i> ”.
6.3.1	Risks due to movements of the carrier	New EHSR combining the old EHSR 6.2.3 and 6.4.2.
6.3.2	Risk of persons falling from the carrier	Previously 6.3 with the following new requirements: <ul style="list-style-type: none"> ■ Carrier must be stable and dangerous movements prevented when the carrier is designed as a work station. ■ Design must prevent inadvertent opening of trapdoors.
6.3.3	Risk due to objects falling on the carrier	“ <i>Where there is a risk of objects falling on the carrier and endangering persons, the carrier must be equipped with a protective roof</i> ”.
6.4	Machinery serving fixed landings	New EHSR.
6.4.1	Risks to persons in or on the carrier	The manufacturer must take: <ul style="list-style-type: none"> ■ Precautions against contact of persons with fixed or moving elements. If necessary the carrier shall be enclosed, with interlocking doors with locking. ■ Measures and devices against uncontrolled upward or downward movements of the carrier. Devices must be able to stop the carrier at maximum load and speed. ■ Measures to prevent harmful decelerations during stopping actions.
6.4.2	Controls at landings	Controls at the landings other than for emergency use shall not initiate movements when control devices in the carrier are operated or when the carrier is not at a landing.
6.4.3	Access to the carrier	Guarding at the landings and on the carrier must ensure a safe transfer of goods and persons to and from the carrier.

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6.5.	Markings	Carrier must be marked with “ <i>the number of persons permitted on the carrier and the maximum working load</i> ”.
Annex II	a) Declaration of conformity b) Declaration of Incorporation	Must include the name and address of the person who will compile the technical file if asked to do so and this person must be resident in the European Economic Area
Annex III	CE marking	New text: <i>The CE marking must be affixed in the immediate vicinity of the name of the manufacturer or his authorised representative, using the same technique. Where the full quality assurance procedure referred to in Article 12(3)(c) and 12(4)(b) has been applied, the CE marking must be followed by the identification number of the notified body.</i>
Annex IV	Categories of machinery to which one of the procedures referred to in Article 12(3) and (4) must be applied	New machines added: <i>18. Portable cartridge-operated fixing and impact machinery</i> <i>19. Protective devices designed to detect the presence of persons</i> <i>20. Power-operated interlocking movable guards designed to be used as safeguards in machinery referred to in points 9, 10 and 11</i> <i>21. Logic units to ensure safety functions</i> <i>22. Roll-over protective structures (ROPS)</i> <i>23. Falling-object protective structures (FOPS)</i>
Annex V	Safety components	Indicative list of safety components added which includes: <i>6. Extraction systems for machinery emissions.</i> <i>7. Guards and protective devices designed to protect persons against moving parts involved in the process on the machinery.</i>
Annex VI	Assembly Instructions for Partly Complete Machines	Description of the assembly instructions which must be supplied with partially complete machines.
Annex VII	Technical File for machines	File must contain: <ul style="list-style-type: none"> • General description of machinery • Overall drawing and control circuit diagrams • Full detailed drawings, accompanied by any calculation notes, test results, certificates, etc., required to check the conformity

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		<ul style="list-style-type: none"> • Documentation on risk assessment demonstrating the procedure followed, including: <ul style="list-style-type: none"> (v) List of essential health and safety requirements which apply (ii) Description of protective measures implemented to eliminate identified hazards or to reduce risks ,and residual risks <ul style="list-style-type: none"> • Standards and other technical specifications used, indicating the EHSRS covered by these standards • Any technical report giving the results of the tests carried out • Copy of the instructions for the machinery • where appropriate <ul style="list-style-type: none"> – Declaration of incorporation for included partly completed machinery and the relevant assembly instructions – EC declaration of conformity of machinery or other products incorporated into the machinery • A copy of the EC declaration of conformity
	Technical file for partially complete machines	<p>File must contain:</p> <ul style="list-style-type: none"> • Overall drawing and control circuit diagrams • Full detailed drawings, accompanied by any calculation notes, test results, certificates, etc., required to check the conformity • Risk assessment documentation showing the procedure followed, including: <ul style="list-style-type: none"> (v) list of the EHSRS applied and fulfilled (ii) description of the protective measures implemented (iii) standards and other technical specifications used, indicating the EHSRS covered by these standards, (iv) any technical report (v) a copy of the assembly instructions for the partly completed machinery;
Annex VIII	Assessment of conformity with	New term for self assessment

EHSR	Heading	Changes in 2006/42/EC
	internal checks on the manufacture of machinery	
Annex IX	EC type-examination	Small changes to previous procedure for Annex IV machines
Annex X	Full quality assurance	New procedure available for Annex IV machines