BRITISH STANDARD

BS EN
12653:2000

Footwear, leather and imitation leather manufacturing machines — Nailing machines — Safety requirements

The European Standard EN 12653:1999 has the status of a British Standard

ICS 61.060

National foreword

This British Standard is the official English language version of EN 12653:1999.

The UK participation in its preparation was entrusted by Technical Committee MCE/3, Safeguarding of machinery, to Subcommittee MCE/3/12, Leather products machinery, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 25 and a back cover.

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 February 2000

ISBN 0 580 35291 9

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12653

October 1999

ICS 61.060

English version

Footwear, leather and imitation leather manufacturing machines – Nailing machines – Safety requirements

Machines pour la fabrication des chaussures et articles en cuir et en matériaux similaires – Machines à clouer – Exigences de sécurité

Maschinen für die Herstellung von Schuhen aus Leder und Kunstleder – Nagelmaschinen – Sicherheitsanforderungen

This European Standard was approved by CEN on 4 September 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12653:1999 E

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 201 "Leather and imitation leather goods and footwear manufacturing machinery - Safety", the Secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in accordance with EN 1070.

The machinery concerned and the extent to which hazards are covered are indicated in clause 1.

1 Scope

This standard is applicable to nailing machines used in the footwear manufacturing industry, namely:

- heel attaching machines (see figure 1)
- heel nailing machines (see figure 2)
- gang nailing machines (see figure 3)

This standard does not apply to gang nailing machines which comply in all respects with the requirements for seat lasting machines: see EN 931.

This standard specifies safety requirements for the design and construction of nailing machines. No specific requirements are included for transport, commissioning and decommissioning.

It takes account of intended use, foreseeable misuse, component and system failure.

This standard covers all hazards relevant to the footwear manufacturing industry. Use of the machines within the scope of this standard in different industries may give rise to hazards which were not taken into account at the time of its preparation.

This standard applies to machines manufactured after its date of issue.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1:1991 Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology.

EN 292-2:1991	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications.
EN 294:1992	Safety of machinery - Safety distance to prevent danger zones being reached by the upper limbs.
EN 547-1	Safety of machinery - Human body measurements - Part 1: Principles for determining the dimensions required for openings for whole body access into machinery
EN 547-2	Safety of machinery - Human body measurements - Part 2: Principles for determining the dimensions required for access openings.
EN 563:1994	Safety of machinery - Temperatures of touchable surfaces – Ergonomics data to establish temperature limit values for hot surfaces.
EN 574: 1996	Safety of machinery - Two-hand control devices - Functional aspects - Principles for design.
EN 894-1	Safety of machinery - Ergonomic requirements for the design of displays and control actuators - Part 1: General principles for human interaction with displays and control actuators.
EN 894-2	Safety of machinery - Ergonomic requirements for the design of displays and control actuators - Part 2: Displays.
prEN 894-3	Safety of machinery - Ergonomic requirements for the design of displays and control actuators - Part 3: Control actuators
EN 931	Footwear manufacturing machines – Lasting machines – Safety requirements.
EN 953:1997	Safety of machinery - Guards - General requirements for the design and the construction of fixed and movable guards.
EN 954-1	Safety of machinery – Safety related parts of control systems - Part 1: general principles for design.
EN 982:1996	Safety of machinery - Safety requirements for fluid power systems and components - Hydraulics.
EN 983:1996	Safety of machinery - Safety requirements for fluid power systems and components - Pneumatics.
EN 999:1998	Safety of machinery - The positioning of protective equipment in respect of approach speed of the parts of the human body

prEN 1005-2	Safety of machinery - Human physical performance - Part 2: Manual handling of objects associated with machinery.
prEN 1005-3	Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation.
EN 1037:1995	Safety of machinery - Prevention of unexpected start-up.
EN 1070	Safety of machinery - Terminology.
EN 1088 : 1995	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
prEN 1760-2:1996	Safety of machinery - Pressure sensitive protective devices - Part 2: general principles for the design and testing of pressure sensitive edges and pressure sensitive bars
prEN ISO 3740	Acoustics - Determination of sound power levels of noise sources - Guidelines for the use of basic standards (ISO/DIS 3740:1998).
EN ISO 4871	Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996).
EN ISO 9614	Acoustics - Determination of sound power level of noise sources using sound intensity.
EN ISO 11200	Acoustics - Noise emitted by machinery and equipment - Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and other specified positions (ISO 11200:1995).
EN ISO 11688-1	Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO TR 11688-1:1998)
EN ISO 11689	Acoustics – Procedure for the comparison of noise-emission data for machinery and equipment (ISO 11689:1996).
prEN 12545	Footwear, leather and imitation leather goods manufacturing machines - Noise test code - Common requirements
EN 60204-1:1992	Safety of machinery - Electrical equipment of machines; Part 1: General requirements (IEC 204-1:1992)
EN 60227-1	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements

EN 60245-1 Rubber insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements

EN 60947-4-1 Low-voltage switchgear and control gear - Part 4 Contactors and motor-starters - Section 1 - Electromechanical contactors and motor-starters (IEC 947-4-1:1990)

EN 60947-5-1 Low-voltage switchgear and control gear - Part 5-1: Control circuit devices and switching elements - Electro-mechanical control circuit devices
(IEC 947-5-1:1997).

3 Definitions

For the purposes of this European Standard the definitions given in EN 1070 as well as the following definitions are applicable.

3.1 heel attaching machine (see figure 1): Machine which attaches the heel to the shoe by means of a screw while it is still on the last. The heel can be positioned on the shoe in advance by the use of an adhesive.

3.2 heel nailing machine (see figure 2): Machine which nails the heel onto the unlasted shoe (shoe with no last) by means of nails and screw.

3.3 gang nailing machine (see figure 3): Machine which nails the sole onto the shoe in the heel area using nails while it is still on the last.

3.4 hold down (see zone 1 in figures 1, 2 and 3): Clamping device to hold the heel during positioning on the unit sole and nailing process.

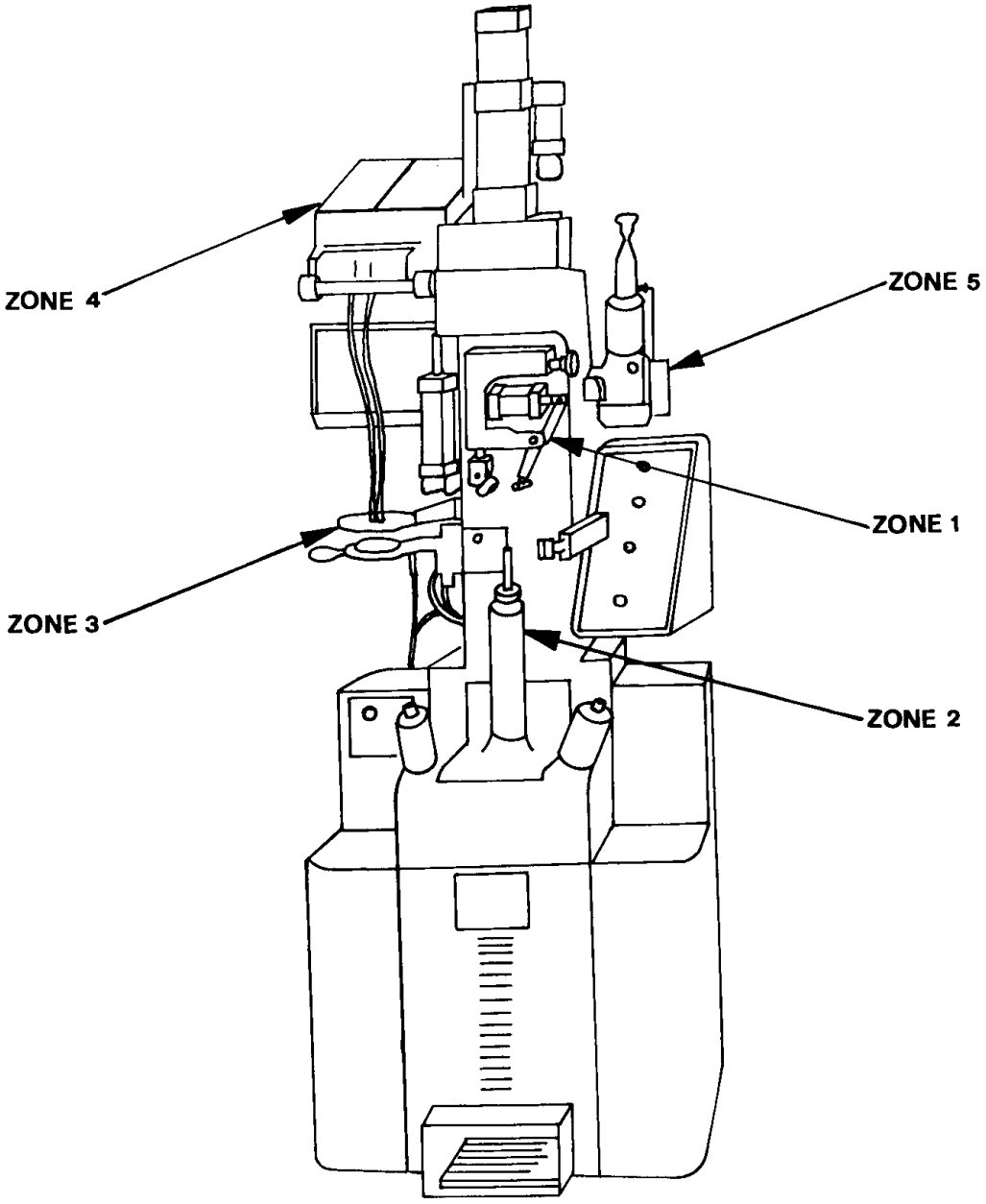
3.5 nailing jack (see zone 2 in figures 1, 2 and 3): Device into which nails are fed before being nailed into the sole/heel by the drivers.

3.6 loader arm (see zone 3 in figures 1, 2 and 3): Device which carries the nails into the nailing jack.

3.7 loader (see zone 4 in figures 1, 2 and 3): A box which supplies nails to the loader arm.

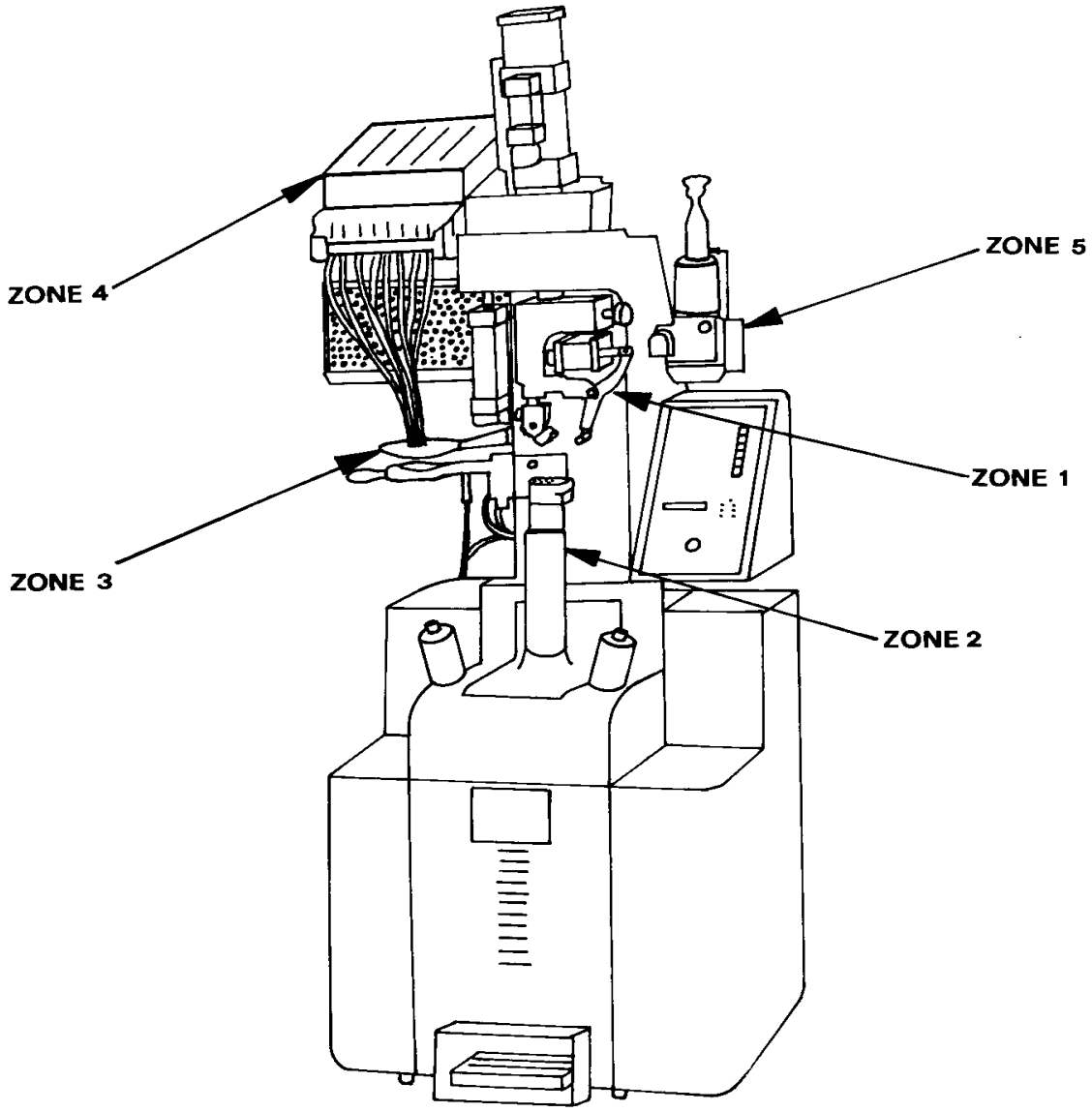
3.8 thermocement melting chamber (see zone 5 in figures 1 and 2): Enclosure where thermocement is melted prior to application.

3.9 automatic cycle for unit sole: A cycle which includes clamping, nailing, clamping release and loading of nails and which can be initiated by a single control signal.



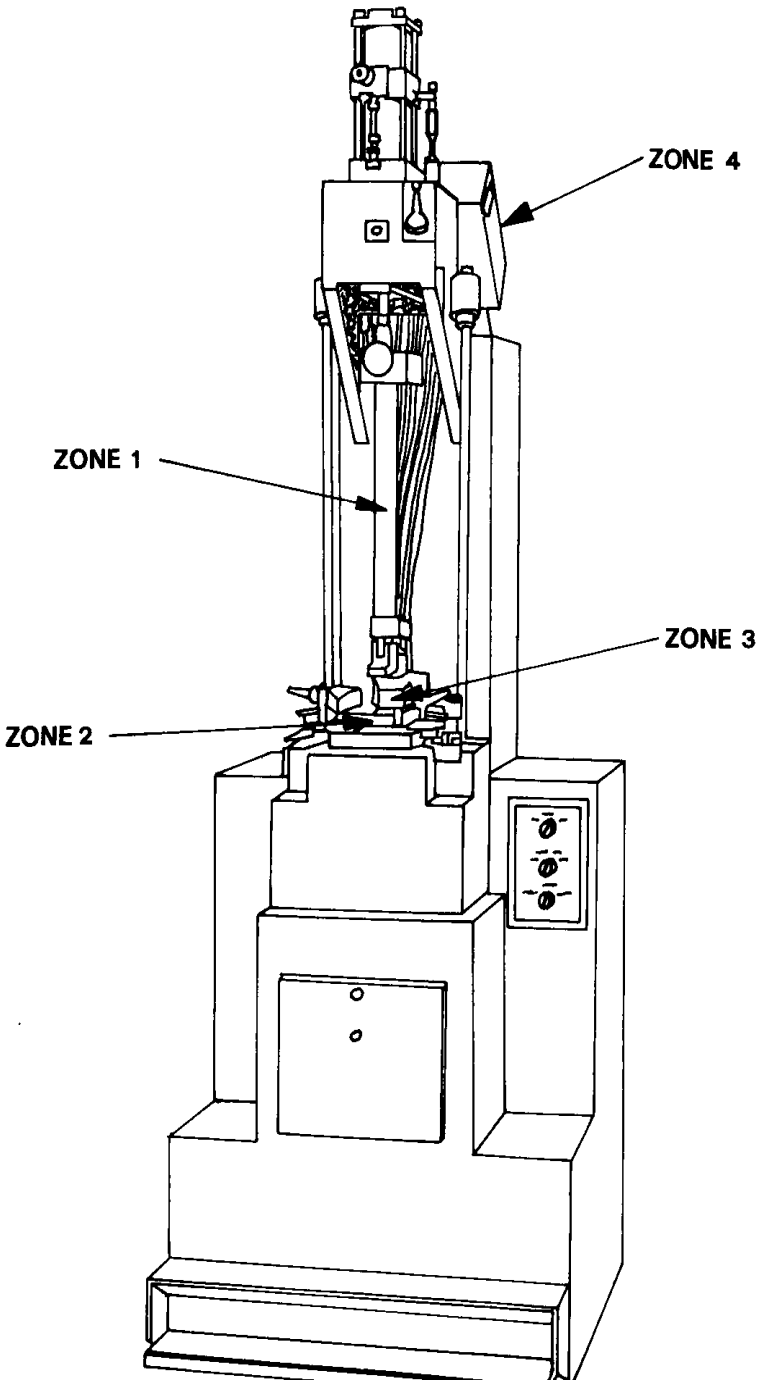
Zone 1: hold down
Zone 2: nailing jack
Zone 3: loader arm
Zone 4: loader
Zone 5: thermocement melting chamber

Figure 1: Heel attaching machine



Zone 1: hold down
Zone 2: nailing jack
Zone 3: loader arm
Zone 4: loader
Zone 5: thermocement melting chamber

Figure 2: Heel nailing machine



Zone 1: hold down
Zone 2: nailing jack
Zone 3: loader arm
Zone 4: loader

Figure 3: Gang nailing machine

4 List of significant hazards

4.1 This clause contains all the significant hazards, as far as they are dealt with in this standard, identified by risk assessment significant for this type of machinery and which require action to eliminate or reduce the risk.

The significant hazards of nailing machines are outlined in 4.3 to 4.9.

4.2 The danger zones which give rise to mechanical hazards are illustrated in figures 1, 2, 3. The figures are informative only.

Table 1: List of significant hazards

Danger zone or source of hazard	Type of hazard	Zone	Figure/Machine
4.3 Mechanical hazards			
4.3.1 Nailing area including - hold down clamp	Crushing	1	1-2-3
- nailing jack	Stabbing/puncture	2	1-2-3
- loader arm	Crushing and/or shearing	3	1-2-3
4.3.2 Movements of loader	Impact	4	1-2-3
4.4 Electrical hazard Electrical contact, direct or indirect caused by: - component failure - insulation failure - incorrect design, installation or component specification of the electrical equipment	Electric shock, burns		
4.5 Noise Noise generated by - the action of the tool on the material or component being worked - hydraulic unit - pneumatic equipment	Hearing loss or interference with communication and acoustic signals		1-2-3
4.6 Thermal hazard Thermocement chamber	Burns Contact or inhalation with harmful fume	5	1-2

Danger zone or source of hazard	Type of hazard
4.7 Functional disorder 4.7.1 High pressure ejection of fluid or ejection of a part of a burst hydraulic component	Burns, injury from hot oil or pipework
4.7.2 Irregular energy supply	Hazards generated by inadvertent movements and process start up
4.7.3 Failure of control system	Unexpected dangerous movements
4.7.4 Errors of fitting	Unexpected dangerous movements
4.8 Neglect of ergonomic principles	
- Excessive effort where the machine production rate is set too slow or too fast	Stress
- Poor working posture	Fatigue
- Incompatibility of machine design with human body dimensions in respect of the working area (e.g. height and size)	Fatigue
Poor control, layout and graphics	Fatigue

5 Safety requirements and/or measures

Machinery shall comply with the safety requirements and/or measures of this clause.

In addition, the machine shall be designed according to the principles of EN 292 for hazards relevant but not significant which are not dealt with by this standard.

5.1 General

See A.1.1.2 of EN 292-2:1991.

5.2 Common requirements for all nailing machines

5.2.1 Mechanical equipment

5.2.1.1 With the exception of the nailing area, dangerous motions of drives and moving machinery parts shall be safeguarded by fixed enclosing guards or fencing according EN 953 and 4.2.2.2 of EN 292-2:1991. Fencing shall be positioned in accordance with the distances given in table 1, table 3 and table 4 of EN 294:1992.

5.2.1.2 Fixed enclosing guards and fencing shall be designed in such a manner that a tool is required for fixing or removal. See 3.22.1 of EN 292-1:1991.

5.2.2 Electrical equipment

5.2.2.1 Electrical systems and equipment shall be in accordance with EN 60204-1:1992 and with EN 60947-5-1.
The minimum degree of protection is IP 54.
The power supply shall be within the limit specified in 4.3 and 4.4 of EN 60204-1:1992.

5.2.2.2 The operator controls and electrical controls which require adjustment for changing the working process shall be located on the outside of the switch cabinets.

5.2.3 Noise

Noise reduction shall be carried out by incorporating, as an integral part of the design, one or more of the following features:

a) reduction of vibration through the static and dynamic balancing of rotating parts;

b) reduction of vibration within the machine by reducing both the mass of moving parts and their acceleration;

c) proper choice and design of the transmission components (gears, pulleys, belts, bearings);

d) design of the machine structures taking into consideration vibration damping and avoidance of structural resonance;

e) fitting pneumatic exhaust silencers, damping of hydraulic circuits.

This list of technical measures for noise reduction at the source gives only examples and is not meant to be complete.
These measures are recommended but not compulsory.

Other appropriate measures with identical or greater efficacy can be selected considering EN ISO 11688-1.

5.2.4 Thermal protection

Hot surfaces which do not need to be exposed for processing but which are accessible shall be safeguarded against accidental contact to prevent burn injury.

This can be met by covering the hot surfaces with insulating material or additional covers so that the temperature does not exceed the minimum temperatures of burn threshold indicated in EN 563.

Insulation materials shall not contain asbestos.

5.2.5 Contact or inhalation with harmful fumes

The associated risk is very low during the normal use but could increase during cleaning and maintenance. Because the fumes will depend on the products used in thermocement chamber, it is not possible to give any specific protective measures. Instructions shall be supplied for cleaning and maintenance. See the last paragraph of 7.1.

5.2.6 Functional disorders

5.2.6.1 To prevent high pressure ejection of fluid or ejection of burst hydraulic or pneumatic components the system shall satisfy the requirements of 3.8 of EN 292-2:1991, EN 982 and EN 983.

5.2.6.2 Devices in accordance with EN 1037 shall be fitted to prevent uncontrolled dangerous motions caused by irregularity, failure or unexpected re-connection of the power supply or when the control circuit has been switched off.

5.2.6.3 Unless otherwise stated in 5.3, safety related parts of the machine control:

- shall have at least the same safety level as the safeguarding used

and

- shall, however, have a control system complying with at least category 1 of EN 954-1 and annex B of this standard.

The use of programmable electronic systems (PES) shall not reduce any level of safety laid down in this standard. When a machine is fitted with a programmable electronic system, safety related functions shall not rely solely up on it. This requirement is met by the use of:

- additional hardwired control system

or

- other provisions for redundancy.

5.2.7 Ergonomics

EN 547-1, EN 547-2, EN 894-1, prEN 1005-2 and prEN 1005-3 shall be respected.

5.2.8 Control systems

All the machines shall have a start control fitted at the working zone. The control system shall automatically assume a safe condition if any of the energy inputs are unavailable.

The control system shall be designed so that in the event of a failure of one or more of the power sources there shall be no movement of the machine parts and the machine cannot start without the operator resetting the controls.

Hydraulic equipment shall be in accordance with EN 982;
pneumatic equipment shall be in accordance with EN 983;
electrical equipment shall be in accordance with EN 60204-1.

Design of display and control actuators shall consider the ergonomic requirements included in EN 894-1, prEN 894-2 and prEN 894-3.

5.2.9 Emergency stop equipment

For all machines, the supply disconnecting device serves the function of emergency stop (see 10.7.5 of EN 60204-1:1992).

5.3 Requirements for the specific danger zones

Heel attaching, heel nailing and gang nailing machines. The requirements listed in 5.3.1 to 5.3.5 are applicable to all the machines within the scope of this standard. Refer to figures 1 to 3 and to the definitions in 3.4 to 3.8 for the identification of danger zone.

5.3.1 Zone 1 - Hold down.

5.3.1.1 For the shoe.

A two stages approach operation for the clamping device is required:

a) low pressure approach to a maximum contact pressure of 20 N/cm^2. When the low pressure control pedal is released the clamping equipment shall return to the start position;

b) high pressure to complete the cycle by a two hand control device type III A of EN 574 with a control system complying with category 1 of EN 954-1, which satisfies the criteria in EN 574 and EN 999.

The two hand control device shall be operative only when the first stage a) is complete.

5.3.1.2 For the unit sole.

A two stages approach operation for the clamping device is required:

a) low pressure approach to a maximum contact pressure of 20 N/cm^2. When the low pressure control pedal is released the clamping equipment shall return to the start position;

b) high pressure to complete the cycle by a two hand control device type III A of EN 574 with a control system complying with category 1 of EN 954-1, which satisfies the criteria in EN 574 and EN 999.

The two hand control device shall be operative only when the first stage a) is complete

or, as an alternative to the two stage approach (a + b):

c) a trip device, which satisfies prEN 1760-2, or fixed guard, which satisfies EN 953, at the heel front and side area of the sole which stops clamping until the gap is 8 mm or less.

5.3.1.3 For the unit sole during automatic cycle.

A protection feeler or fixed guard in the heel front and side area of the sole which stops the clamping until a maximum gap of 8 mm.

5.3.2 Zone 2 - Nailing Jack.

A two hand control device type III A of EN 574, with a control system complying with at least category 1 of EN 954-1, which satisfies the criteria in EN 574, and EN 999:1998 is required for the unlasted shoe (see 5.3.1.1) and for the sole (see 5.3.1.2 a), b) and c)).

5.3.3 Zone 3 - Loader arm.

A stop and release control device, shall stop all dangerous movements of the loader arm when any object is met whilst it is in motion. This satisfies the criteria in annex A of this standard and EN 999.

5.3.4 Zone 4 - Loader.

If the loader is in an accessible position, its motions shall be safeguarded by fixed guards or fencing which satisfies EN 953 and 4.2.2.2 of EN 292-2:1991.

Fencing shall be positioned in accordance with the distances given in table 1, table 3 and table 4 of EN 294:1992.

5.3.5 Zone 5 -Thermal protection for thermocement melting pot (see figure 1 and 2).

Requirements for these types of hazard are described in 5.2.4.

6 Verification of the safety requirements and/or measures

Aspects of machine design and construction shall be subject to verification by inspection, calculation and testing and final verification shall be accomplished in a fully commissioned condition by checking that:

- all "A" and "B" standards referred to in clause 5 are interpreted correctly (in particular see EN 292-1, EN 292-2, EN 294, EN 60204-1);
- the category of all safety related parts of control systems is correct;
- particular specifications (e.g. velocities and forces) are within acceptable limits;
- all special guards and safety devices are in place, effective and adequately dimensioned;
- adequate information is contained in the instruction handbook.

The verification shall follow the detailed requirements of clause 5.

The following table gives a checklist of items to be verified:

Table 2

Clause Subclause	Subject	Rel. Standards	Verification Method
5.2 For all footwear nailing machines covered by this standard			
5.2.1.1 and 5.2.1.2	Transmission machinery - fixed guards - fencing	 EN 292-2:1991 EN 294:1992 EN 953:1997	Verification of fastening type, measurement of distances according to: clause 4, annex A tables 1, 3, 4 clause 8 the guard shall withstand a minimum force of 800 N in an area of 0,01 m^2 in the middle of the guard
5.2.2	Electrical equipment	 This European Standard EN 60204-1:1992 EN 60947-5-1	 visual inspection see 5.2.2.2 examination with suitable measuring instruments (see clause 20) examination with suitable measuring instruments

Clause Subclause	Subject	Rel. Standards	Verification Method
5.2.3	Noise reduction means	This European Standard EN 292-2:1991 prEN 12545	5.2.3 annex A, 1.5.8 Visual inspection annex A, 1.7.4.f check of manufacturer's documentation General technical information Measurement, declaration and verification according to the prEN 12545 Until detailed technical specifications on noise, completing the general specifications given in EN 12545, are available for the machinery covered by this European Standard, the noise declaration by the manufacturer shall indicate precisely - the mounting and operating conditions of the machinery during noise emission measurement - the workstation position(s) where noise emission sound pressure levels have been determined - the noise measurement methods used As a guidance, methods to be used should be based on:
		EN ISO 11200 prEN ISO 3740 or EN ISO 9614 EN ISO 4871	determination of emission sound pressure level at workstation - determination of sound power level - declaration and verification of noise emission values Note: collection and comparison of noise emission data If a comparison of collected noise emission values is perfomed, it should be done according to EN ISO 11689.
5.2.4	Hot surfaces Thermal protection	EN 563:1997 This European Standard	in accordance with clause 6 specification as set out in 5.2.4, measurement of surface temperatures

Clause Subclause	Subject	Rel. Standards	Verification Method
5.2.5	Contact or inhalation with harmful fluid	This European Standard	In accordance with 7.1
5.2.6	Functional disorders	EN 292-2:1991 EN 982:1996 EN 983:1996 EN 954-1:1996 EN 1037:1995 This European Standard	3.8 clause 6 clause 6 check of manufacturer's documentation (design and material used) category 1 5.4 visual inspection according to 5.2.6, verification as per annex B
5.2.7	Ergonomics	EN 547-1 EN 547-2 EN 894-1 prEN 1005-2 prEN 1005-3	Measurement Measurement Measurement Measurement
5.2.8	Controls - electric systems - pneumatic systems - hydraulic systems - displays and actuators	 EN 60204-1 EN 983 EN 982 EN 894-1 EN 894-2 EN 894-3	 9.4.2.4 Visual inspection visual inspection visual inspection visual inspection visual inspection visual inspection
5.2.9	Emergency stop	 EN 60204-1:1992 This European Standard	Visual inspection and examination of function 10.7.5 5.2.9

Clause Subclause	Subject	Rel. Standards	Verification Method
5.3.1	Hold down zone 1 - low pressure approach (force limitation) Hold-to-run control - two hand control device - trip device - guard	 This European Standard This European Standard EN 60204-1:1992 EN 574:1996 EN 999 EN 954-1 prEN 1760-2:1996 EN 953:1997	 measurement of force can be achieved by the use of a membrane hydraulic piston connected with an electronic pressure measurement device in accordance with 5.3.1 of this standard Inspection, examination of function in accordance with 5.3.1 In accordance with 9.2.5.7 clause 10 distance at which controls are placed visual inspection, examination of function and verification of device category clause 7 clause 8 the guard shall withstand a force of 800 N in an area of 0,01 m^2 in the middle of the guard
5.3.2	Nailing jack zone 2 two hand control device	 EN 60204-1:1992 EN 574:1996 EN 999 EN 954-1	 in accordance with 9.2.5.7 clause 10 distance at which controls are placed visual inspection examination of function and verification of device category
5.3.3	Loader arm zone 3 - stop and release control device pressure sensitive bar	 This European Standard This European Standard EN 999	 according to annex A as specified in this standard distance at which controls are placed

Clause Subclause	Subject	Rel. Standards	Verification Method
5.3.4	Loader zone 4 - fixed guards - fencing	 EN 292-2:1991 EN 294:1992 EN 953:1997	 Verification of fastening type, measurement of distances according to: clause 4, annex A tables 1,3,4 clause 8 the guard shall withstand a force of 800 N in an area of 0,01 m^2 in the middle of the guard
5.3.5	TC melting pot zone 5 - thermal protection	 see 5.2.4 of this standard	 see 5.2.4 of this standard

7 Information for use

7.1 Instructions for use - Instruction handbook

Basic information shall be provided in accordance with 5.5 of EN 292-2:1991.

In particular the instruction handbook of the machine shall contain information relating to the use of the machine: for example, description of controls, modes and means for stopping, instructions for setting and adjustment, information about the residual hazards such as the safe use of hold down, nailing jack, loader arm, loader, thermocement melting pot.

The instruction handbook shall include information about possible hazards during cleaning and maintenance of thermocement chamber.

7.2 Information concerning airborne noise emissions

Declared noise emission values shall be provided in accordance with 1.7.4 f) of annex A of EN 292-2:1991, prEN 12545:1999 and EN ISO 4871.

7.3 Minimum marking

7.3.1 See 5.4 and 1.7.3 of annex A of EN 292-2:1991.

7.3.2 Machines shall be marked legibly and indelibly with the following additional information (where applicable):

a) net mass;

b) - information on electrical equipment required by clause 18 of EN 60204-1:1992;

- supply data about pressure range for hydraulic system, see EN 982:1996, and for pneumatic systems, see EN 983;

- flexible pipes containing pressurized hydraulic and pneumatic fluids shall be labelled indicating maximum safe working pressure in kilopascals.

7.3.3 The manufacturer shall also label appropriate parts of the machine with information concerning the specification of lubricants and hydraulic fluids.

Annex A
(normative)

Stop and release control device

The stop and release control device shall meet the following requirements:

A.1 The stop and release control device shall be available and operational at all times, regardless of the operating mode.

NOTE: When the stop release control device can be disconnected or when machinery can be partially isolated, care should be taken to avoid confusion between active and inactive control devices.

A.2 The actuator and its position sensor shall apply the principle of positive mechanical actuation (see 3.5 of EN 292-2:1991). The electrical position sensor shall comply with 10.1.3 of EN 60204-1:1992, and EN 60947-5-1.

Annex B
(normative)

Well tried components and principles: category 1 of EN 954-1

For the purposes of this Standard "well tried components and principles" means:

B.1 Electrical components if they comply with relevant Standards such as:

- EN 60947-5-1 for control switches with positive opening operation (clause 3) used as mechanically actuated position detectors for interlocking of guards and for relays used in auxiliary circuits;

- EN 60947-4-1 for electromechanical contactors and motor starters used in main circuits;

- EN 60245-1 for flexible cables;

- prEN 60227-1 for polyvinyl chloride cable if this cable is additionally protected against mechanical damage by positioning (e. g. inside frames).

B.2 Electrical indent of principles if they comply with the measures listed from the first to the fourth indent of 9.4.2.1 of EN 60204-1:1992. The circuits shall be hard wired. Electrical components alone do not fulfil category 1.

B.3 Mechanical components if they comply with 3.5 of EN 292-2:1991.

B.4 Mechanically actuated position detectors for guards if they are actuated in positive mode and their arrangement/fastening and the cam design/mounting comply with 5.2.2 and 5.2.3 of EN 1088:1995.

B.5 Pneumatic and hydraulic components and systems shall comply with EN 982 and EN 983 respectively.

Verification

Verification is made:

- by checking the relevant drawings and/or circuit diagrams and inspection of the machine;

for electrical components:

- by requiring a confirmation from the manufacturer of the component which declares conformity with the relevant standards.

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directives:

Machinery Directive 89/392/EEC and its amendments 91/368/EEC and 93/44/EEC

Compliance with this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

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