BRITISH STANDARD

BS EN
931 : 1998

Footwear manufacturing machines — Lasting machines — Safety requirements

The European Standard EN 931 : 1997 has the status of a British Standard

ICS 59.140.40

National foreword

This British Standard is the English language version of EN 931 : 1997.

The UK participation in its preparation was entrusted by Technical Committee MCE/3, Safeguarding of machinery, to Subcommittee MCE/3/12, Leather products machinery — Safety, 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.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

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English version

Footwear manufacturing machines — Lasting machines — Safety requirements

Machines pour la fabrication de chaussures — Machines à monter — Prescriptions de sécurité

Maschinen zur Herstellung von Schuhen — Zwickmaschinen — Sicherheitsanforderungen

This European Standard was approved by CEN on 1997-07-16. 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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

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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 February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

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.

Contents

0 Introduction

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery should comply as appropriate with EN 292-2 : 1991 for hazards which are not covered by this standard.

This standard contains safety requirements for lasting machines. It is aimed at designers, manufacturers, suppliers and importers.

1 Scope

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

– adhesive forepart lasting machines (see figure 1);

– hand-operated adhesive side lasting machines (see figure 3A);

– adhesive seat lasting machines (see figure 2);

– adhesive seat and side lasting machines (see figure 2);

– hand-operated tack/staple side lasting machines (see figure 3B);

– tack seat lasting machines (see figure 2);

– tack seat and side thermocement lasting machines (see figure 2);

– tack heel seat and thermocement side lasting machines (see figure 2);

– tack heel seat and thermocement and tack side lasting machines (see figure 2).

1.2 This standard does not apply to lasting machines which process granular thermocement.

1.3 This standard specifies requirements for safe design, construction and use of the machines. No specific requirements are included for transport, commissioning and decommissioning. It takes account of intended use, foreseeable misuse, component and system failure.

1.4 This standard covers all hazards relevant to the footwear manufacturing industry. The use of 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.

1.5 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 distances to prevent danger zones being reached by the upper limbs*
EN 418 : 1992	*Safety of machinery — Emergency stop equipment; functional aspects — Principles for design*
prEN 547-1 : 1991	*Safety of machinery — Human body dimensions — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*
prEN 547-2 : 1991	*Safety of machinery — Human body dimensions — Part 2: Principles for determining the dimensions required for access openings*
EN 563 : 1994	*Safety of machinery — Temperature of touchable surfaces — Ergonomic data to establish temperature limit values for hot surfaces*
prEN 894-1 : 1992	*Safety of machinery — Ergonomic requirements and data for the design of displays and control actuators — Part 1: Human interaction with displays and control actuators*
prEN 953 : 1992	*Safety of machinery — General requirements for the design and the construction of guards (fixed, movable)*
EN 954-1 : 1996	*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*
prEN 1005-1 : 1993	*Safety of machinery — Human physical performance — Part 1: Terms and definitions*
prEN 1005-2 : 1993	*Safety of machinery — Human physical performance — Part 2: Manual handling of heavy weights associated with machinery*
prEN 1005-3 : 1993	*Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*
EN 1037 : 1995	*Safety of machinery — Isolation and energy dissipation — Prevention of unexpected start-up*

ENV 1070 : 1993	*Safety of machinery — Terminology*
EN 23740 series[1)]	*Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic standards*
EN ISO 4871[1)]	*Acoustics — Declaration and verification of noise emission values of machinery and equipment* (ISO 4871 : 1996)
EN ISO 9614[1)]	*Acoustics — Determination of sound power level of noise sources using sound intensity*
EN ISO 11200 series[1)]	*Acoustics — Noise emitted by machinery and equipment — Guidelines for the use of basic standards for the determination of emission sound pressure levels at the work station and at other specified positions* (ISO 11200 : 1995)
EN ISO 11689[1)]	*Acoustics — Systematic collection and comparison of noise emission data for machinery and equipment* (ISO 11689 : 1996)
EN 60204-1 : 1992	*Safety of machinery — Electrical equipment of machines — Part 1: General requirements*
EN 60947-5-1 : 1992	*Low-voltage switchgear and controlgear — Part 5: Control circuit devices and switching elements — Section 1: Electromechanical control circuit devices*

3 Definitions

For the purposes of this European Standard, the definitions given in ENV 1070 : 1993, as well as the following definitions, are applicable.

3.1 pincer (see figure 1, zone 1; figure 2, zone 2; figure 3B, zone 1):

Device for gripping, pulling or holding the upper and/or lining.

3.2 wiper (see figure 1, zone 2; figure 2, zone 1):

An assembly used for moulding and attaching the upper and lining to the insole.

3.3 injector (see figure 1, zone 2; figure 2, zone 1 and 3; figure 3A, zone 1):

Device for applying cement onto the insole, upper or lining.

3.4 lasting finger, lasting band, roll (see figure 2, zone 2; figure 3A, zone 1):

A tool for moulding and attaching the upper/lining edge to the insole.

3.5 driver (see figure 2, zone 1 and 3; figure 3B, zone 1):

Tacking hammer.

3.6 heel band

Heel seat moulding device.

3.7 toe band (see figure 1, zone 2):

Upper holding and moulding device in the toe area.

3.8 side clamp (see figure 1, zone 2; figure 2, zone 2):

Device for holding the side upper/lining.

3.9 toe pad (see figure 1, zone 2):

Device for holding and pressing the last in the toe area against the wipers.

3.10 heel rest (see figure 1, zone 3):

Device for holding the back of the shoe last.

3.11 wiper-head (see figure 1, zone 2):

Support for the wiper assembly.

3.12 jack post (see figure 2, zone 1):

Shoe last support.

3.13 sensor foot (see figure 2, zone 1):

Device for aligning the shoe last with the wipers.

3.14 toe holder (see figure 2, zone 4):

Device for clamping the toe of the shoe last.

3.15 driver clamp (see figure 3B, zone 1):

Device for guiding and supporting the driver.

3.16 thermocement melting chamber (see figure 3A, zone 1):

Enclosure where thermocement is melted prior to application.

3.17 working area

The zone of the machine which comprises:

a) the area where lasting takes place by means of the wipers, pincers, side clamps, toe pads, jack post and heel rest;

b) the loading area where the loading takes place;

c) the operator standing area.

3.18 stop-and-release control

Device which stops the machine at any point in its cycle and returns the machine to rest.

4 List of hazards

4.1 The significant hazards at lasting 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, 3A and 3B. The figures are informative only.

[1)] These standards are in progress in ISO (revision of ISO 6081 in the case of the EN ISO 11200 series, revision of the ISO 3740 series, revision of ISO 4871, publication of ISO 9614 and ISO 11689 pending).

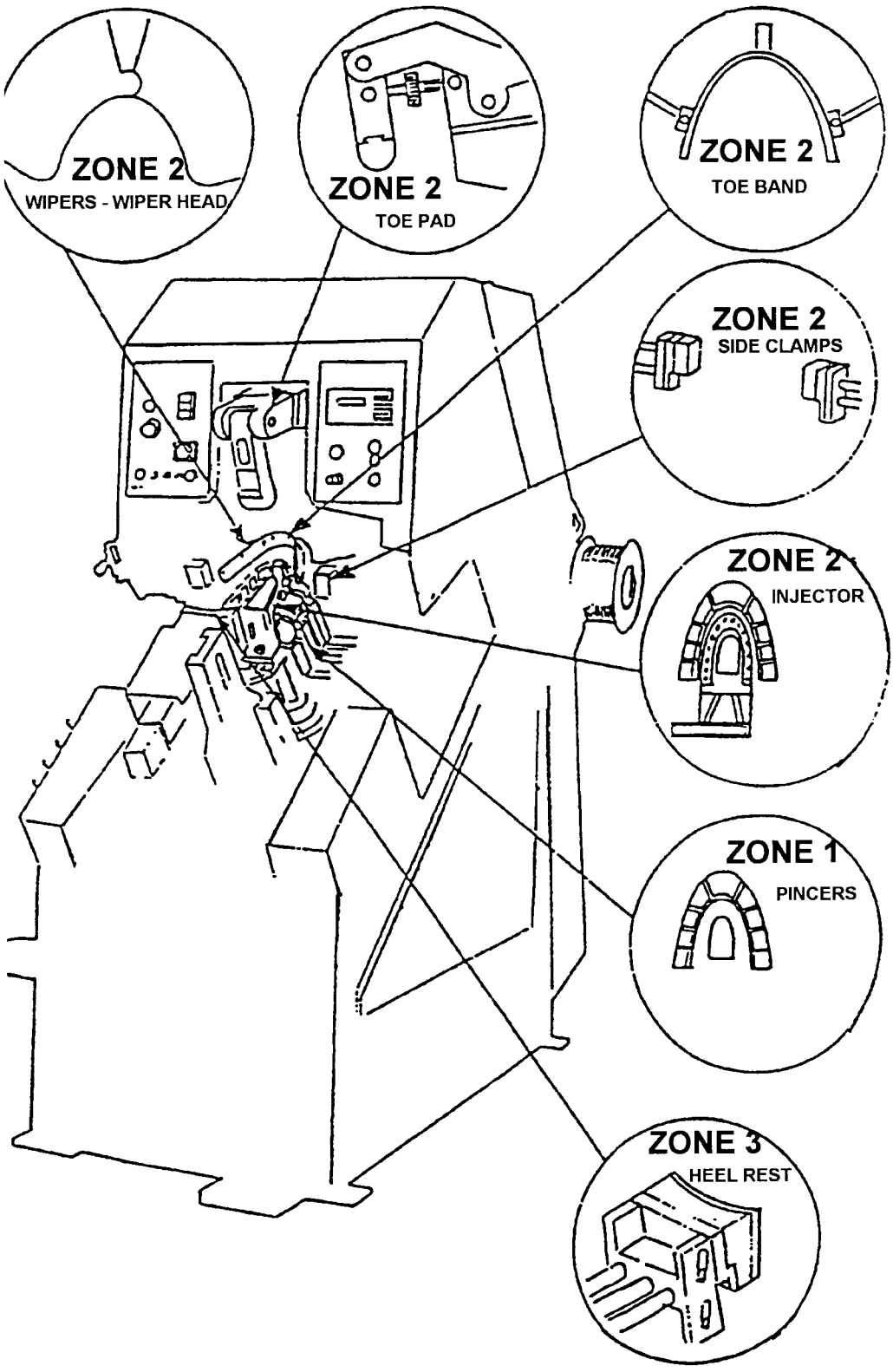

Figure 1. Forepart lasting machine

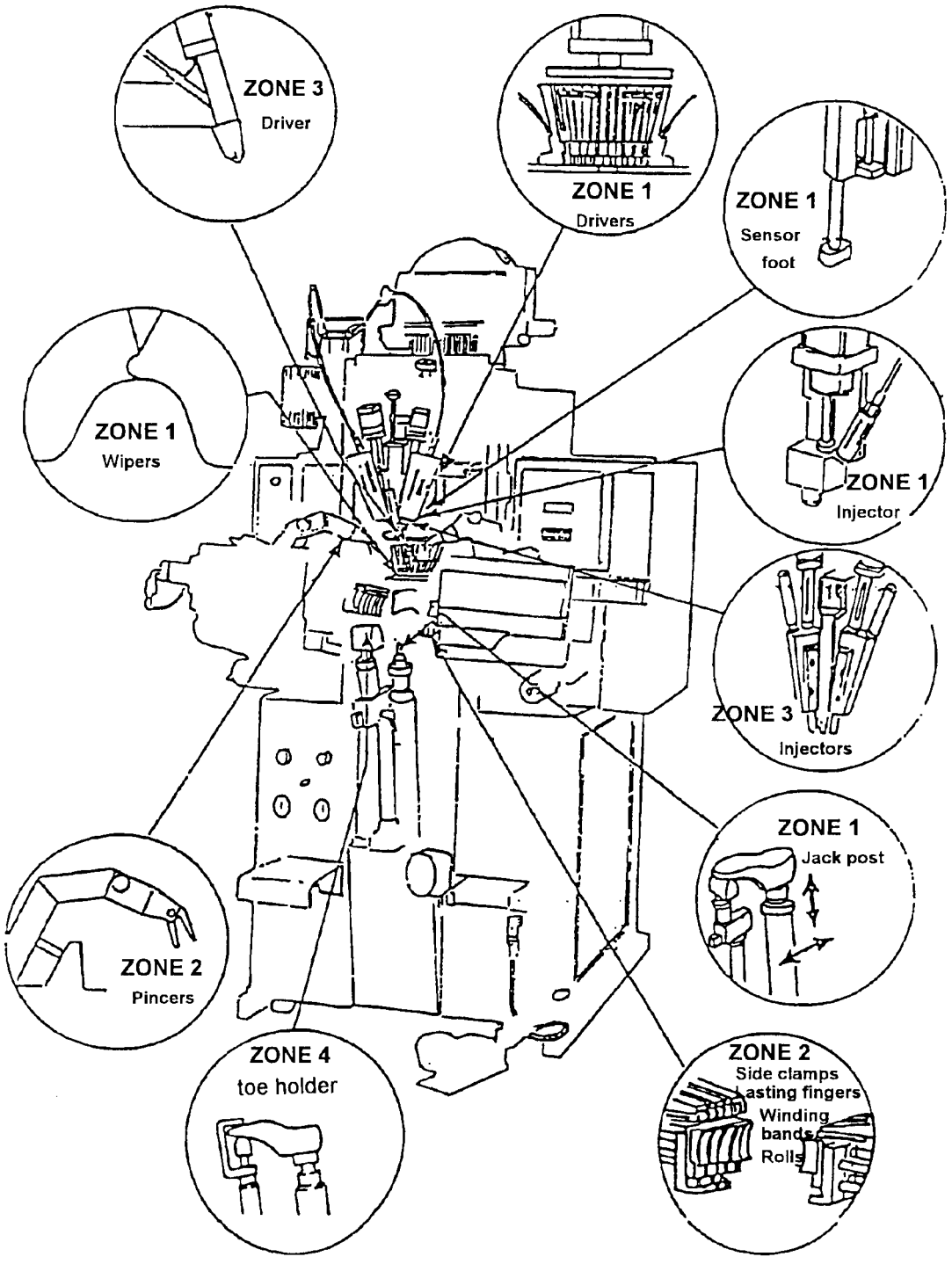

Figure 2. Seat lasting machine, seat and side lasting machine

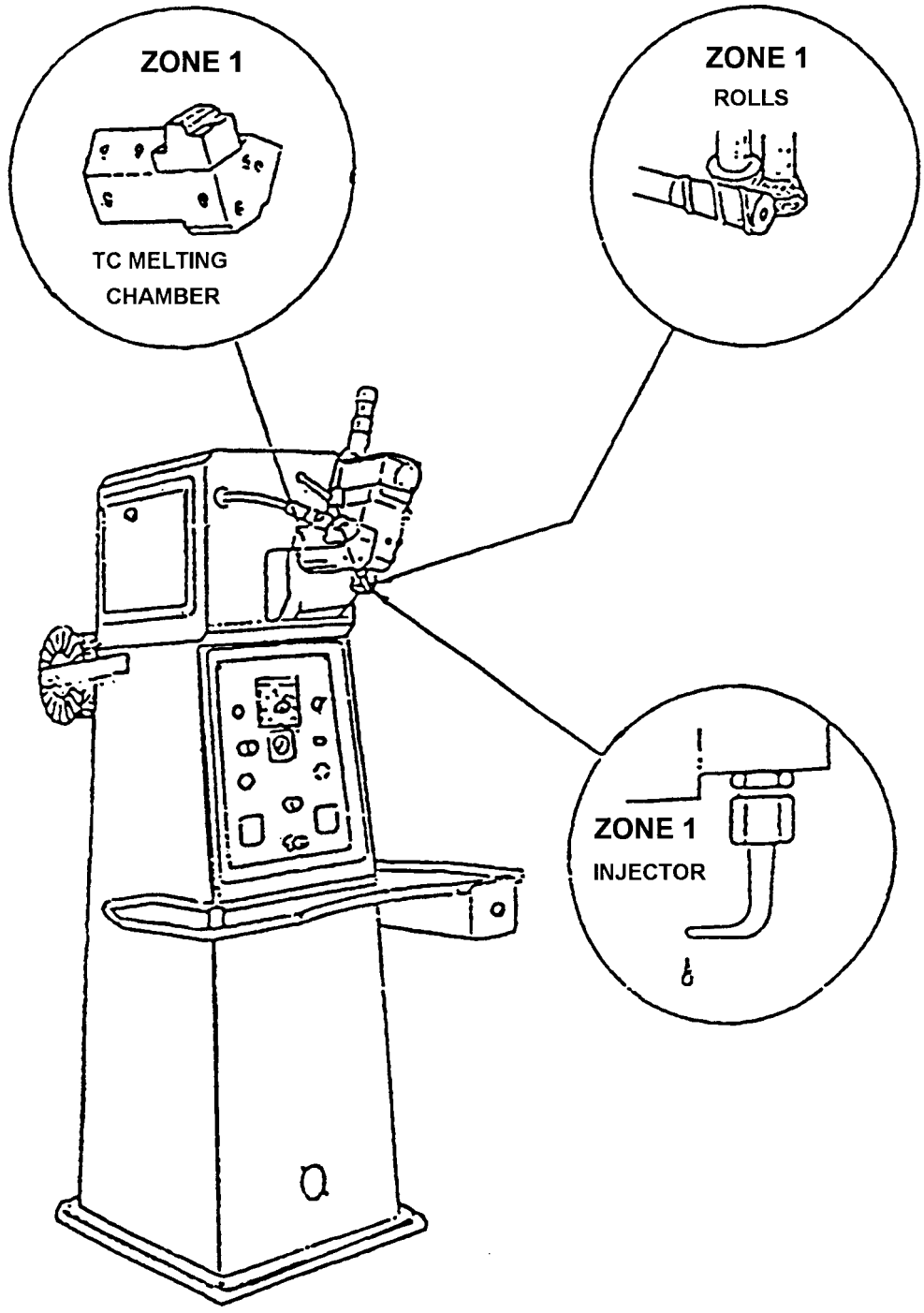

Figure 3A. Thermocement side lasting machine

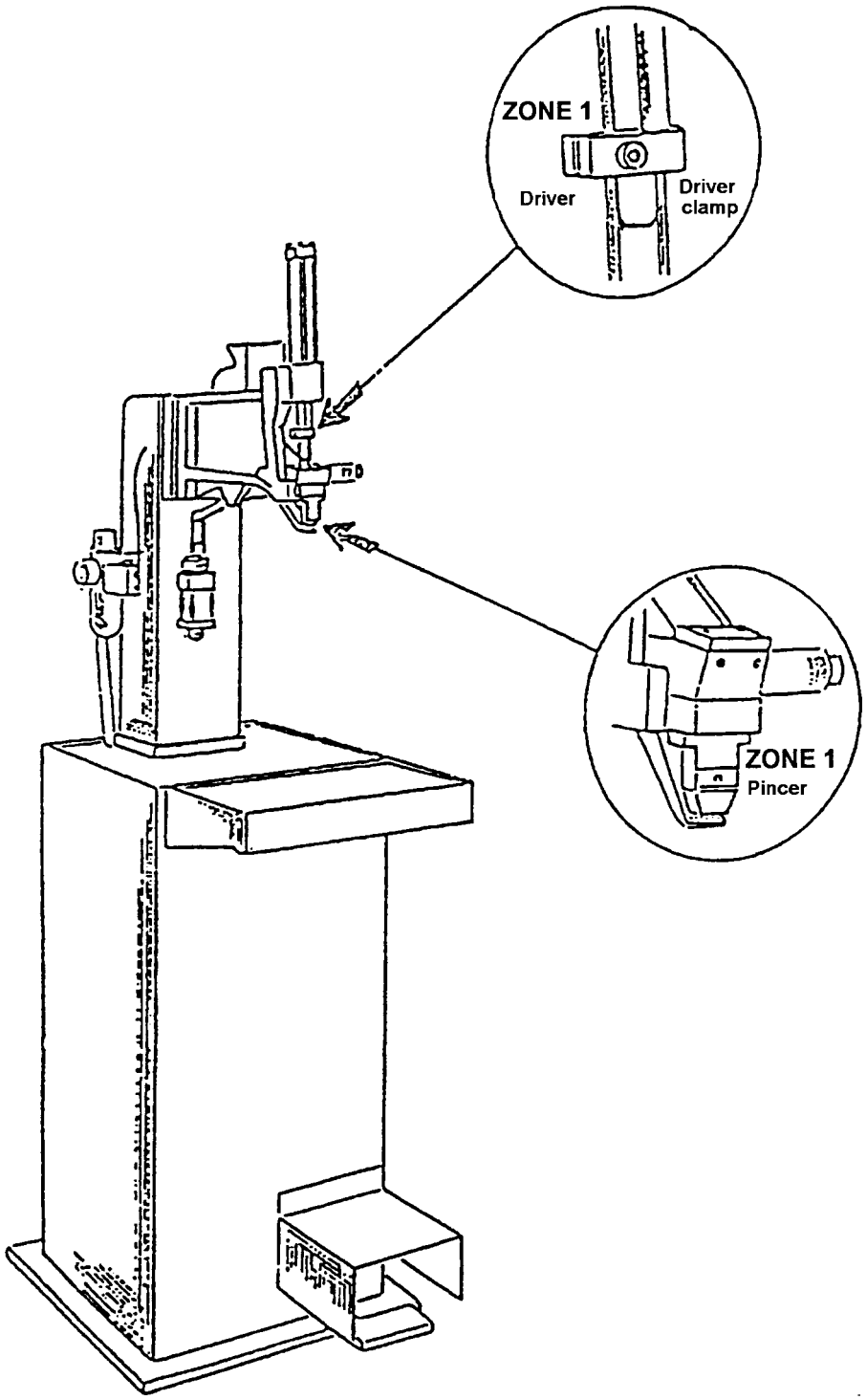

Figure 3B. Tack/staple side lasting machine

Table 1. List of hazards

Danger zone or source of hazard	Type of hazard	Zone	Figure/machine
4.3 Mechanical hazards			
4.3.1 Lasting area, including:	Crushing and/or shearing	1	1 and 3B
– pincers		2	2
– wipers, wiper-head	"	2 1	1 2
– side clamps	"	2	1 and 2
– toe pads, toe band, heel rest	"	2 3	2 1
– driver(s), driver clamp	"	1 and 3	2 and 3B
– sensor foot, jack post, toe holder	"	1 4	2 2
– lasting finger, lasting band and rolls	Crushing and/or shearing and entanglement	2 2 and 1	2 2 and 3A
4.3.2 Movements of injectors or drivers	Impact and stabbing	1 and 3 1	2 3B
4.3.3 Other movements within the side lasting unit	Entanglement	2	2
4.3.4 Driver clamp	Ejection of machine parts	1	3B
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		
4.6 Material and substances emission			
Fumes evolved as a result of overheating thermocement	Health, risk of occupational disease		
4.7 Thermal hazard			
4.7.1 Accidental contact with hot surfaces:	Burns	2 1	1 2
– melting thermocement chamber		1	3A
– injector(s)		2 1 and 3 1	1 2 3A
4.7.2 Ejection of hot thermocement from the injector	Burns	1 and 3 1	2 3A

Table 1. List of hazards *(continued)*			
Danger zone or source of hazard	**Type of hazard**	**Zone**	**Figure/machine**
4.8 Functional disorder			
4.8.1 High-pressure ejection of fluid or ejection of a part of a burst hydraulic component	Burns, injury from hot oil or tubing		
4.8.2 Irregular energy supply	Hazards generated by inadvertent movements and process start-up		
4.8.3 Failure of control system (malfunction of interlocking devices)	Unexpected dangerous movements		
4.8.4 Errors of fitting	Unexpected dangerous movements		
4.9 Neglect of ergonomic principles			
– Excessive efforts (production rate too slow or too fast on automatic machines)	Stress		
– Bad working posture	Fatigue		
– Incompatibility of the machine design with human anatomy in the working area (for example the height and size)	Fatigue		
– Poor control, layout and graphics	Fatigue		

5 Safety requirements and/or measures

5.1 General

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

5.2 Common requirements for all lasting machines

5.2.1 *Mechanical equipment*

5.2.1.1 With exception of the lasting area, the dangerous motions of drives and moving machinery parts shall be safeguarded by fixed enclosing guards or fencing which satisfies prEN 953 : 1992 and **4.2.2.2** of EN 292-2 : 1991.

Fencing shall be positioned in accordance with the distances given in tables 1, 3 or 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 EN 60947-5-1 : 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 is possible 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 transmission components (gears, pulleys, belts, bearings etc.);

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

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

This list of technical measures for noise reduction at the source is informative only and not meant to be complete.

These measures are recommended but not compulsory. Alternative measures with identical or higher efficacy can be used.

5.2.4 *Material and substances emission*

Lasting machines using thermocement shall have protection in the form of a thermal fuse or back-up thermostat to ensure that the thermocement temperature does not exceed 250 °C, to prevent excessive fumes due to overheating.

5.2.5 ***Thermal protection***

5.2.5.1 Hot surfaces which are not directly required for the working process and to which exposed persons have access 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 temperature of burn threshold indicated in EN 563 : 1994.

Insulation materials shall not contain asbestos.

5.2.5.2 Lasting machines which use hot thermocement adhesive shall be provided with means to minimize the risk of injury by ejection of hot adhesive. This shall be achieved by careful consideration of injector design, pressure control, temperature control, physical guards, thermal fuses and back-up thermostats. At the time of writing this standard, it was recognized that it is not possible to eliminate completely the risk of injury.

5.2.6 ***Functional disorders***

5.2.6.1 To prevent high-pressure ejection of fluid or ejection of a burst part, hydraulic and pneumatic systems shall satisfy **3.8** of EN 292-2 : 1991, EN 982 : 1996 and EN 983 : 1996.

5.2.6.2 Devices shall be fitted, in accordance with EN 1037 : 1995, which prevent uncontrolled dangerous movements caused by irregularities, failure or unexpected reconnection of the power supply or when the control circuit has been switched off.

5.2.6.3 Unless otherwise indicated in **5.3**, safety-related parts of the machine control system:

– shall have at least the same level of safety as the safeguarding used;

and

– shall, however, as a minimum comply with category 1 of EN 954-1 : 1996 and annex B.

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 upon it. This requirement is met by the use of:

– an additional hard-wired control system;

or

– other provisions for redundancy.

5.2.7 ***Ergonomics***

prEN 547-1 : 1991, prEN 547-2 : 1991, prEN 894-1 : 1992, prEN 1005-2 : 1993 and prEN 1005-3 : 1993 shall be respected.

5.3 Requirements for specific machines

5.3.1 ***Forepart lasting machine***

5.3.1.1 *Zone 1*

At the time of drafting this standard it was not considered practicable to provide physical safeguards for the mechanical hazards in this danger zone. Therefore, the manufacturer shall provide adequate information with the machine concerning the correct operation of the pincers.

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control which satisfies annex A of this standard and EN 418 : 1992.

5.3.1.2 *Zone 2*

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control which satisfies annex A of this standard and EN 418 : 1992.

5.3.1.3 *Zone 3*

When the heel meets an obstacle with a closing force exceeding 250 N, it shall stop automatically and shall cease to apply force.

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control which satisfies annex A of this standard and EN 418 : 1992.

5.3.2 ***Seat lasting, seat and side lasting machine***

5.3.2.1 *Zone 1*

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control (or push-buttons on both sides for heel seat lasting machines only) which satisfies annex A of this standard and EN 418 : 1992.

The closing force arising between the sensor foot and jack post shall not exceed 250 N until the gap between the sensor foot and the last is less than 8 mm.

5.3.2.2 *Zone 2*

At the time of drafting this standard it was not considered practicable to provide physical safeguards against the hazards in this danger zone. Therefore, the manufacturer shall provide the user with adequate information concerning safe use.

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control (or push-buttons on both sides for heel seat lasting machine only) which satisfies annex A of this standard and EN 418 : 1992.

5.3.2.3 *Zone 3*

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control (or push-buttons on both sides for heel seat lasting machine only) which satisfies annex A of this standard and EN 418 : 1992.

5.3.2.4 *Zone 4*

A stop-and-release control device, to category 1 of EN 954-1 : 1996 and annex B of this standard, shall be designed and arranged in such a manner that it can be actuated by a treadle and/or knee control (or push-buttons on both sides for heel seat lasting machine only) which satisfies annex A of this standard and EN 418 : 1992.

The closing force applied by the toe holder shall not exceed 250 N until the gap between the toe holder and the last is less than 8 mm.

5.3.3 ***Hand-operated side lasting machine***

Zone 1

Thermocement injection or tack and staple nailing shall be controlled by a hold-to-run control treadle. Release of the treadle shall return the machine to its rest condition.

6 Verification of the safety requirements and/or measures

Aspects of machine design and construction can 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 : 1991, EN 292-2 : 1991, EN 294 : 1992, EN 60204-1 : 1992);

– that the category of all safety-related control systems is correct;

– that particular specifications (e.g. velocities and forces) are within acceptable limits;

– that all specified guards and safety devices are in place, effective and adequately dimensioned;

– that adequate information is contained in the instruction handbook.

The verification shall follow the detailed requirements of clause **5**.

Table 2 gives a check-list of the items to be verified.

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 pincers, side clamps, lasting fingers, lasting bands and rolls.

7.2 Information concerning noise emissions

Declared noise emission values shall be provided in accordance with **1.7.4**f of annex A of EN 292-2 : 1991 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 the pressure range for hydraulic systems (see EN 982 : 1996) and for pneumatic systems (see EN 983 : 1996).

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.

Table 2. Check-list of items to be verified			
Clause; subclause	**Subject**	**Relevant standards**	**Check**
5.2	For all footwear lasting machines		
5.2.1.1 and **5.2.1.2**	Transmission machinery: fixed enclosing guards		Verification of fastening type, measurement of distances in accordance with:
		EN 292-2 : 1991	clause **4**, annex A
		EN 294 : 1992	tables 1, 3 or 4 (as appropriate), minimum distances
		prEN 953 : 1992	clause **8**;
			the guard shall as a minimum withstand a 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	Visual inspection; see **5.2.2.2**
		EN 60204-1 : 1992	Examination with suitable measuring instruments (see clause **20**)
5.2.3	Noise reduction means	This European standard	**5.2.3**
		EN 292-2 : 1992	Visual inspection and annex A, **1.7.4**f, check of manufacturer's documentation. The measurement, declaration and verification of noise emission values shall be made according to the EN... noise test code. (NOTE. This code is under preparation by TC 201/WG 5). Until the specific EN noise test code is published, 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 guide, methods to be used should be based on:
		EN ISO 11200	Determination of emission sound pressure levels at workstations
		EN 23740 or EN ISO 9614	Determination of sound power level
		EN ISO 4871	Declaration and verification of noise emission values. NOTE. Collection and comparison of noise emission data
			Collection and comparison of noise emission from machinery covered by this safety standard shall be done in compliance with the methods given in EN ISO 11689 (currently in preparation in ISO)
5.2.4	Material and substances emission	This European Standard	Measurements of the temperature: the maximum temperature shall not exceed 250 °C according to **5.2.4**
5.2.5.1	Hot surfaces, thermal protection	EN 563 : 1994	According to clause **6**
		This European standard	Specification of **5.2.5.1** Measurement of surface temperatures

Table 2. Check-list of items to be verified *(continued)*

Clause; subclause	Subject	Relevant standards	Check
5.2.6	Functional disorders	EN 292-2 : 1992	**3.8**
		EN 982 : 1996	clause **6**
		EN 983 : 1996	clause **6** Check of manufacturer's documentation (design and material used)
		EN 954-1 : 1996	clause **9** — category 1, annex B
		EN 1037 : 1995	**5.4**
		This European Standard	Visual inspection in accordance with **5.2.6**
5.2.7	Ergonomics	prEN 547-1 : 1991	Measurement
		prEN 547-2 : 1991	Measurement
		prEN 894-1 : 1992	
		prEN 1005-2/3 : 1993	Measurement
5.3.1	For forepart footwear lasting machines		
5.3.1.1	Lasting area zone 1		
	– pincers	EN 292-2 : 1992	**5.5**
		This European Standard	**5.3.1.1** Check that information for user is adequate
	– stop-and-release control device	EN 292-2 : 1992	Practical check in accordance with **6.1.1**
		EN 60204-1 : 1992	**9.2.5.4**
		EN 418 : 1992	clause **4**
		EN 954-1 : 1996	clause **9** — category 1, annex B
		This European Standard	**5.3.1.1** and annex A
5.3.1.2	Stop-and-release control device	see **5.3.1.1**	see **5.3.1.1**
5.3.1.3	Lasting area zone 3		
	– heel rest (force limitation)	This European Standard	Measurement of force can be achieved by the use of a membrane hydraulic piston connected to an electronic pressure measurement device in accordance with **5.3.1.3**
	– stop-and-release control device	see **5.3.1.1**	see **5.3.1.1**
5.3.2	For seat lasting, seat and side lasting machines		
5.3.2.1	Lasting area zone 1	EN 292-2 : 1992	Practical check in accordance with **6.1.1**
	– stop-and-release control device	EN 60204-1 : 1992	**9.2.5.4**
		EN 418 : 1992	clause **4**
		EN 954-1 : 1996	clause **9** — category 1, annex B
		This European Standard	**5.3.2.1** and annex A
	– jack post (force limitation)	This European Standard	Measurement of force can be achieved by the use of a membrane hydraulic piston connected to an electronic pressure measurement device in accordance with **5.3.2.1**
	– sensor foot	EN 294 : 1992	tables 1, 3 or 4 (as appropriate)
		This European Standard	Measurement of the gaps in accordance with specification of **5.3.2.1**

Table 2. Check-list of items to be verified *(continued)*

Clause; subclause	Subject	Relevant standards	Check
5.3.2.2	Lasting area zone 2	EN 292-2 : 1992	**5.5** **5.3.2.2** Check that information for user is adequate
	– pincers, lasting fingers, winding bands, rolls, side clamps		
	– stop-and-release control device	see **5.3.2.1**	see **5.3.2.1**
5.3.2.3	Stop-and-release control device	see **5.3.2.1**	see **5.3.2.1**
5.3.2.4	Lasting area zone 4		
	– stop-and-release control device	see **5.3.2.1**	see **5.3.2.1**
	– toe holder (force limitation)	This European Standard	Measurement of force can be achieved by the use of a membrane hydraulic piston connected to an electronic pressure measurement device in accordance with **5.3.2.4**
	– toe holder (gap limitation)	EN 294 : 1992	tables 1, 3 or 4 (as appropriate)
		This European Standard	Measurement of the gaps in accordance with specification of **5.3.2.4**
5.3.3	Hold-to-run control treadle	This European Standard	Inspection, examination of function in accordance with **5.3.3**

Annex A (normative)

Stop-and-release control device

The stop-and-release control device (see **3.18**) 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-and-release control devices 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 action (see **3.5** of EN 2922 : 1991).

Electrical position sensors shall comply with **10.1.3** of EN 60204-1 : 1992 and with EN 60947-5-1 : 1992.

Annex B (normative)

Well tried components and principles: category 1 of 7.2 of EN 954-1 : 1996

For the purpose 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 : 1992 for control switches with positive opening operation (section 3) used as mechanically actuated position detectors for interlocking of guards and for relays used in auxiliary circuits;

– EN 60947-4-1 : 1992 for electromechanical contactors and motor starters used in main circuits;

– prEN 60245-1 : 1992 for flexible cables;

– prEN 60227-1 : 1992 for polyvinyl chloride cable, if this cable is additionally protected against mechanical damage by positioning (e.g. inside frames).

B.2 Electrical principles if they comply with measures listed from first to fourth indent in **9.4.2.1** of EN 60204-1 : 1992. The circuits shall be hard-wired. Electronic 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 : 1996 and EN 983 : 1996 respectively.

Verification

Verification is to be made:

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

for electrical components:

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

Annex C (informative)

Bibliography

The following documents have been used to prepare this standard:

EN 414 : 1992 *Safety of machinery — Rules for the drafting and presentation of safety standards*

EN 1050 : 1996 *Safety of machinery — Principles for risk assessment*

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 safety requirements of EU Directive 89/392/EEC as amended by 91/368/EEC, 93/44/EEC and 93/68/EEC.

WARNING. Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

The clauses of this standard are likely to support requirements of the Directive referred to above.

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

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