

ELECTRICALLY OPERATED FURNITURE WORKSHOP

FORTHCOMING STANDARDS & ROUTES TO COMPLIANCE





WELCOME AND INTRODUCTIONS



Levent Caglar
Senior Ergonomist & Standards
& Regulatory Expert
Fira-International Ltd



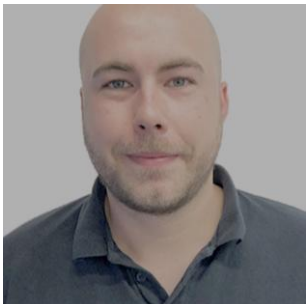
Bruce Lovell
Consultant
Fira-International Ltd



Howard James
Testing & Technical Manager
Fira-International Ltd



James Moore
Technical Specialist
Fira-International Ltd



Sean Crisp
Technical Specialist
Fira-International Ltd



REQUIREMENTS FOR ELECTRICALLY OPERATED FURNITURE

Electrically operated furniture is considered to be "machinery" under the Machinery Regulation (EU) 2023/1230 **(MR)**.

The MR replaces the Machinery Directive (MD) and will apply from 20 January 2027.

Therefore, all electrically operated furniture must fulfil the Essential Health and Safety Requirements (EHSRs) of the Machinery Regulation.



POSSIBLE ROUTES TO COMPLIANCE

1. Compliance with harmonised (in UK designated) standards gives presumption of conformity with the corresponding essential requirements of the Machinery Regulations:
 - EN 17684
 - CENELEC EN 60335-2-116
2. Undertaking risk assessment in accordance with EN 12100: 2010 Safety of Machinery.

USE OF STANDARDS FOR COMPLIANCE WITH EHSR'S OF THE MACHINERY REGULATION

- **EN 17684 : 2026**
(Stability, mechanical safety and durability)
- **EN IEC 60335-2-116: 2026**
(Electrical safety)



FPREN 17684

Applies to electrically operated furniture for use in areas accessible by adults and children (aged 4 and over) and domestic pets.

It excludes requirements for children aged under 4 and for domestic pets. **(However - covered by warnings)**



FPREN 17684

Includes requirements for:

- Stability
- Strength
- Durability

These requirements are the same as for non-electrically operated furniture.

This document excludes any electrically operated furniture for medical purpose.





FPREN 17684 - HAZARD IDENTIFICATION AND RISK ASSESSMENT

A risk assessment shall be conducted for all identified hazards.

Key Considerations

- Use, maintenance, and adjustment activities
- Unexpected start-up, operation, or stopping
- Reasonably foreseeable misuse
- Control system failures and their consequences

FPREN 17684

Throughout the expected life of the furniture the safety requirements are:

- Based on the hazardous situations
- Events identified during intended use, and reasonably foreseeable misuse



FPREN 17684 - HAZARD IDENTIFICATION AND RISK ASSESSMENT

Risks would be increased when:

- Elderly, disabled or children come into contact with moving parts
- Use of remotes in the operation of furniture
- Lack of visibility
- The velocity of moving parts



ANNEX A contains the significant hazards and hazardous events for electrically operated furniture



HAZARDS COVERED FPREN 17684

Type or group	Clause/sub-clause of this document or other standards
Mechanical hazards	FprEN 17684:2025 Clause 5
Electrical hazards	EN IEC 60335-2-116:2025
Thermal Hazards	EN IEC 60335-2-116:2025
Noise hazards	Not dealt with as not significant
Vibration hazards	Not dealt with as not significant
Radiation hazards	EN IEC 60335-2-116:2025
Material/substance hazards	only mechanical risks covered
Ergonomic hazards	FprEN 17684:2025 Clause 5
Hazards associated with the environment in which the furniture is operated	Not dealt with – only mechanical risks covered
Combination of hazards	Not dealt with as not significant

MECHANICAL HAZARDS

Hazards		Clause/sub-clause of this document or other standard
Origin(a)	Potential consequence(b)	
▪ Movement of a part of the furniture ▪ Speed of operation ▪ Shear and compression Sharp edges and corners Holes in tubular or rigid components ▪ Falling parts (e.g. Wall units and components) ▪ Lack of stability ▪ Breaking parts (failure of furniture – lack of strength/durability) Movement against another item of furniture or building Cables	▪ Compression ▪ Shearing ▪ Impact ▪ Cutting or severing ▪ Trapping ▪ Asphyxiation ▪ Tripping and falling	FprEN 17684:2025 Clause 5



ERGONOMIC HAZARDS

Hazards		Clause/sub-clause of this document or other standard
Origin(a)	Potential consequence(b)	
▪ Access ▪ Design or location of indicators and visual display units ▪ Design, location or identification of control devices ▪ Exit/entry to the furniture ▪ Local lighting ▪ Visibility	▪ Discomfort ▪ Fatigue ▪ Musculoskeletal disorder ▪ Stress ▪ Any other (e.g.: as a consequence of human error)	FprEN 17684:2025 Clause 5



A2 LIST OF HAZARDOUS SITUATIONS, DESCRIBED IN TERMS OF TASKS

Phases of the furniture life cycle	Tasks	Clause/sub-clause of this document
Transport	Lifting Loading Packing Transportation Unloading Unpacking	Not dealt with This standard does not deal with risks associated with transport
Assembly and installation Commissioning	Assembly of knock-down furniture Fixing to the wall (wall mounted units) Connecting to a power supply	Clause 6
Instructions	Guidance in safe operation Operation by vulnerable users Warning of residual risk	Clause 6
Operation	Safe operation in intended use and reasonably foreseeable misuse Operation by vulnerable users Remote operation Operation in relation to other items (furniture, building, etc.)	Clause 5 and 6
Cleaning Maintenance	Adjustments Unbalanced rotating parts Worn parts Discomfort	Clause 6



A.3 LIST OF HAZARDOUS EVENTS, COVERED BY THIS DOCUMENT

Origin related to	Tasks	Clause/sub-clause of this document
Higher specified risk while used over a longer period	Office work Educational institutions	Clause 5.2
Shape and/or superficial finishing of accessible parts	Contact with sharp edges Contact with holes and gaps	Clause 5.4
Moving parts of the electrically operated furniture	Contact with the moving parts Compression and shear Entrapment	Clause 5.4
Loss of stability of the electrically operated furniture	Impact with the operator Operator falling/tripping	Clause 5.3
Failure during operation of the furniture during its intended use and reasonably foreseeable misuse	Failure of components Impact with the operator Operator falling/tripping	Clause 5.3
Failure due to items falling or being ejected during operation of the furniture during its intended use and reasonably foreseeable misuse	Failure of components Impact with the operator Operator falling/tripping	Clause 5.3



5.4.4 SHEAR AND COMPRESSION REQUIREMENTS

No gaps shall be created between 7mm and 223mm throughout the whole movement range.

If this requirement cannot be met, one of the following should be fulfilled:

- Clause 5.4.5 Provision of protective guards
- Clause 5.4.6 Use of Biased-off switches and associated requirements
- Clause 5.4.7 Impulse Activation switch and associated requirements
- Clause 5.4.8 Remote operations and associated requirements
- Clause 5.4.9 Forces
- Clause 5.4.10 Speed

5.4.6 BIASED-OFF SWITCH (HOLD TO RUN) DEVICES

- The Biased-off switch shall be fixed on the furniture or connected to the furniture via a flexible cord.
- The moving parts shall stop within a travelling distance of 15mm measured at the leading edge.



5.4.7 IMPULSE ACTIVATION DEVICES

1. The impulse activation device shall be fixed on the furniture or connected to the furniture via a flexible cord.
2. The stop function shall be reachable from any position of the moving parts.
3. Unless the force requirement in 5.4.9, is fulfilled, the moving parts shall:
 - Be equipped with a stop function
 - Stop within a travelling distance of 15 mm, measured at the leading edge



5.4.8 REMOTE OPERATIONS

- Moving parts controlled by remote operations shall fulfil the force requirements
- Moving parts controlled by a short range device shall fulfil the force requirements in 5.4.9 or speed requirements in 5.4.10.

Bluetooth is a short range device and it is not considered to be a remote operation.



5.4.9 FORCE REQUIREMENTS

Table 1 — Forces body parts can withstand

	Closing gap size (mm)	Initial maximum force for 0,5 s ^a (N)	Maximum permissible force 0,5 s to 5 s (N)	Sustained max force after 5 s ^b (N)
Gaps between moving parts	7 to 223	280	140	50

NOTE 1 The forces are based on adult data.

NOTE 2 For additional information, see Annex D (Informative) Background to force limits and spring constants.

a after the force has exceeded 140 N

b the evaluation starts after the force initially has exceeded 50 N

- Forces exerted by moving parts for body parts at risk shall not exceed the values given.
- Forces shall be measured using an appropriate force transducer with a resultant spring constant of 75 N/mm ($\pm 10\%$) at the leading edge.

5.4.10 SPEED REQUIREMENTS

Table 2 — Maximum speeds of moving parts

Product Group	Speed of moving parts (mm/s)*
Desks/tables/worksurfaces	100
Recliner seating	150
Riser/recliner seating	40 for lift mechanism, 100 for all other parts
Beds	75
Storage Units	50
Storage unit doors/flat, with total mass* of 10kg	600
Storage unit components, including doors/flaps with a total mass of 25kg	450
Storage unit components with a total mass of more than 25kg	250
Writing boards and TV stands	80
Other furniture	80
The total mass is the mass of the storage unit component plus the mass determined according to the appropriate EN standard for storage furniture	

* Speed of moving parts for different product groups shall not exceed these values.

5.4.11 RISK OF BEING TRAPPED IN THE FURNITURE

Furniture having a component which encloses a continuous volume greater than 0,03 m³ and where all internal dimensions are 150 mm or more, shall provide:

- At least two unobstructed ventilation holes, each 650 mm² or more, situated at least 150 mm apart.

Or

- One single opening which is equivalent to 2 x 650 mm².



OTHER RISK FACTORS TO CONSIDER

- Cable management/trailing wires
- Flammability of coverings/upholstery
- Manual handling/manipulation of the furniture in the environment of intended use
- Cleaning
- User assembly/disassembly
- User maintenance



PRODUCT ASSESSMENTS



ASSESSMENT ACCORDING FPREN 17684: 2025

for **Desking / Worksurfaces**

Table 1: Results of assessment of **PRODUCT NAME** Date: (DD/MM/YYYY) by: XXXX

CLAUSE Number	REQUIREMENT	RESULTS	COMMENT
5.2 Ergonomics	• Dimensions according to EN 527-1 • Controls according to EN ISO 9241-5 • Usability according to EN ISO 9241-5		
5.3. Stability	According to applicable standard for domestic seating EN 527-2		
5.4.3.1 Edges and corners	(a) edges and corners which are directly in contact with the user are rounded or chamfered (b) all other edges and corners accessible during intended and reasonably foreseeable use are free from burrs and/or sharp edges.		

ASSESSMENT ACCORDING FPREN 17684: 2025

5.4.3.2 Holes / Tubular components	No holes in the ends of tubular components or holes in rigid components in accessible parts between 7 mm and 12 mm , unless the depth of penetration is less than 10 mm. This requirement is fulfilled if there is no hazard present when tested in accordance with Annex B.1		
5.4.4 Shear and compression	Do they exist? Check for closing gaps 7 mm to 223 mm (finger probe-head probe En 716) If there are closing gaps in his range one of the requirements in 5.4.5, 5.4.6, 5.4.7, 5.4.8, 5.4.9 or 5.4.10 shall be fulfilled		
5.4.5 Protective guards	Must be able to sustain Minimum force of 50N push/pull		
5.4.6 Biased-off switch (Hold to run) devices	• Shall be fixed to the furniture • Max travelling distance 15mm	Fixed / Not fixed Stopping distance	

ASSESSMENT ACCORDING FPREN 17684: 2025

5.4.7 Impulse activation devices	Unless fulfils force requirements 5.4.9: • Shall be fixed to the furniture • Have a stop function • Max travelling distance 15mm	Yes/No Stopping distance	
5.4.8 Remote operations: Remote controls Blue tooth devices	Must fulfil force <u>reqs</u> (5.4.9) Table 1 Must fulfil force <u>reqs</u> (5.4.9) Table 1, or speed requirements (5.4.10) Table 2	Speed	
5.4.9 Forces	• Initial max 280 N • Permissible max 140 N • Sustained max 50 N		
5.5 Strength and durability	• According to applicable standard • for office desking EN 527-2 • non-domestic EN 12521		



ASSESSMENT ACCORDING FPREN 17684: 2025

User Manual			
6.2 Warnings			
6.3 Instructions for use			
6.4 Assembly instructions			
6.5 Maintenance instructions			
7 Marking			

ASSESSMENT ACCORDING FPREN 17684: 2025

Table 2 — Maximum speeds of moving parts

PRODUCT GROUP	SPEED OF MOVING PARTS ^b (mm/s)
Desk/tables/worksurfaces	100
Recliner seating	150
Riser/recliner seating	100 Lift mechanism 40
Beds	75
Storage units	50
Storage unit components with a total mass ^a of less than 10 kg	600
Storage unit components with a total mass ^a of more than 10 kg to 25 kg	450

ASSESSMENT ACCORDING FPREN 17684: 2025

Storage unit components with a total mass ^b of more than 25 kg or more	250
Writing boards and TV stands	80
Other furniture	80
^a <u>The</u> total mass is the mass of the storage unit component plus the mass determined according to the appropriate EN standard for storage furniture. ^b <u>The</u> adherence of the speed limits acc. to table 2 do not replace the obligation to minimize identified hazards acc. to clause 4	

ADDITIONAL RISKS

Trailing cables / wire lack of cable management?

BS 6396 compliance



VERTI –INSIDE RISE & FALL ELECTRICAL WALL CABINET





ELECTRICAL RISE & FALL WORKTOPS (Mounting frame with safety stop plate)



ELECTRICAL RISE & FALL WORKTOPS (Mounting frame with safety stop plate)

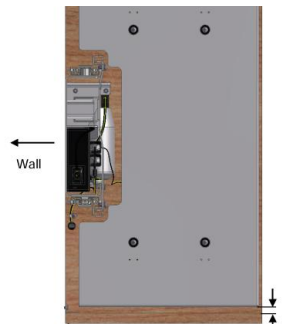


HEIGHT ADJUSTABLE CUPBOARDS

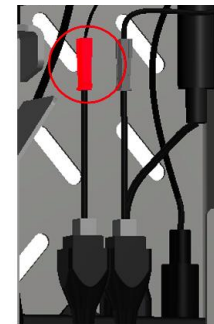
The height of the cupboard is adjusted by means of the control switch connected to the control unit.

The cupboard is adjusted upwards by pressing the UP symbol of the control switch and downwards by pressing the DOWN symbol of the control switch.

As soon as you let go of the control switch, the movement of the unit will stop.



Mount upper safety stop on top of the cupboard. (Illustration shows cupboard viewed from below)

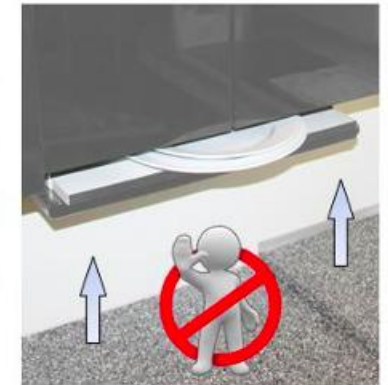


Connect safety stop to control unit, to the cable marked: S1. (See wiring diagram page 8)

12. SAFETY IN USE

- Verti-Inside must only be used by persons who have read and understood these instructions.
- Children & persons with reduced observation capacity should only operate the unit when supervised.
- If the product is used in publicly accessible locations where children or persons with reduced observation capacity may get near the unit, the person operating the unit must pay attention to those present in order to prevent dangerous situations.
- Make sure that there is free space above and below the unit to allow height adjustment.
- Modifications which may influence the performance or design of the unit are not allowed.
- Installation, service, and repair must be carried out by a competent personnel.

Be careful not to get jammed
between shelf and cupboard
door during height adjustment
with closed cupboard door



RISK ASSESSMENT TO EN ISO 12100 (2010)



SUPPLY OF MACHINERY (SAFETY) REGULATIONS 2008: GB

This regulation applies to all machinery placed on the Great Britain market and sets out the essential health and safety requirements that machinery must meet.

What does it mean in practice?

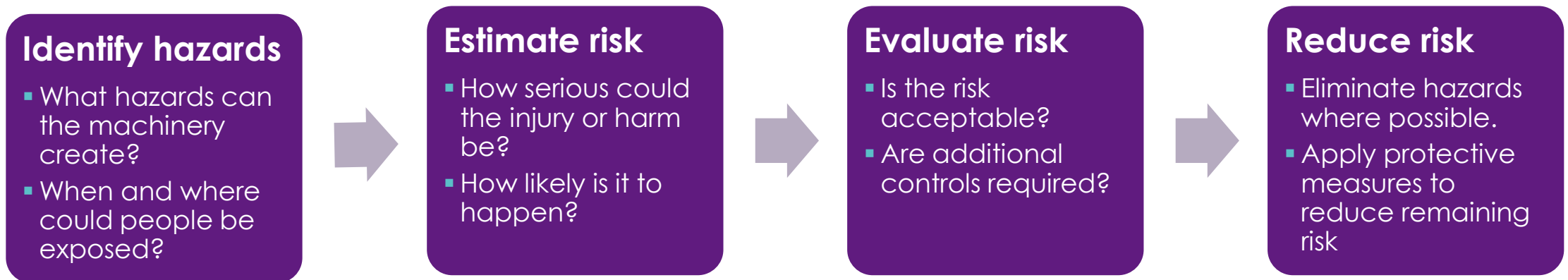
- Carry out a risk assessment
- Identify applicable EHSRs
- Design out hazards where possible
- Compile technical documentation
- Apply the appropriate UKCA/CE marking
- Maintain evidence of compliance



WHY DO WE NEED TO CARRY OUT A RISK ASSESSMENT?

The Supply of Machinery (Safety) Regulations 2008 require manufacturers to carry out a risk assessment before machinery is placed on the market.

The risk assessment process helps ensure that the Essential Health and Safety Requirements (EHSRs) set out in Annex I of the Regulations are identified and addressed.





BS EN ISO 12100 – SAFETY OF MACHINERY

BS EN ISO 12100 Safety of machinery - General principles for design. Risk assessment and risk reduction

Provides a structured approach to:

- Assess and evaluate risks systematically
- Reduce risks using inherently safe design and protective measures
- Integrate safety into the design and development process

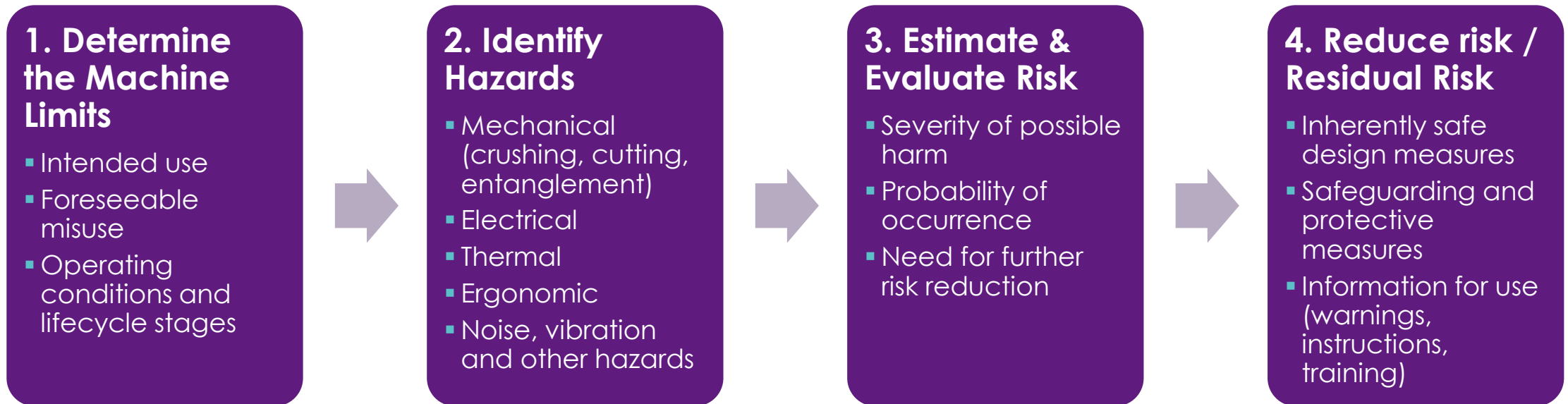
Why it matters

- Supports compliance with the Supply of Machinery (Safety) Regulations 2008
- Applicable to virtually all machinery – A type standard



BS EN ISO 12100 - METHODOLOGY

A structured approach to risk assessment and risk reduction throughout the machinery lifecycle.





METHODOLOGY

When defining the machine limits, consider:

- **Intended use and reasonably foreseeable misuse**
- **Environment of use** (domestic or non-domestic)
- **User groups** (non-professional users, children, elderly, disabled)
- **Materials and substances** used, including any hazardous materials
- **Machine lifecycle**, including transport, installation, assembly, maintenance decommissioning and disposal
- **Operating modes** (manual, automatic, setup, maintenance)

DETERMINE MACHINE LIMITS

Assessment reference:	A Company	Number of operatives:	1
Type of machine:	Recliner	Number of shifts per week:	N/A
Machine location:	Domestic	Usage (mins per day):	4
Machine description:	A Type	Operating manuals:	Yes – English
Machine manufacturer:	A Company	Standard operating procedures:	Non-professional operator
Machine model:	AC0001	Operatives' training record:	Non-professional operator
Machine serial number:	if applicable	Warning signs:	No warning signs
Modifications from 'as-supplied':	None	Raw materials:	List materials
Energy sources:	Electricity	Maintenance manual:	None
Energy source ratings:	240V AC	Maintenance training record:	None
Safety measures:	Hold to Run Switch	Intended use exemptions	Not to be used by children <4 years
Assessment carried out by:	A Person		
Assessment date:	A Date		
Assessment checked by:	A Person		
Assessment approved by:	A responsible company representative		

IDENTIFY HAZARDS

LO (Likelihood of Occurrence)

0.033	Almost impossible	Only in extreme circumstances
1	Highly unlikely	Though conceivable
1.5	Unlikely	But could occur
2	Possible	But unusual
5	Even chance	Could happen
8	Probable	Not surprising
10	Likely	To be expected
15	Certain	No doubt

FE (Frequency of Exposure)

0.5	5 mins (5mins)
1	Hourly (60mins)
1.5	2 Hours (120mins)
2.5	4 Hours (240mins)
4	½ Day (720mins)
5	Constantly (1440 mins)

DPH (Degree of Possible Harm)

0.1	Scratch or bruise
0.5	Laceration or mild ill-effect
2	Break of minor bone or minor illness (temporary)
4	Break of major bone or major illness (temporary)
6	Loss of one limb, eye, hearing (permanent)
10	Loss of two limbs or eyes (permanent)
15	Fatality

NP (Number of Persons at Risk)

1	1-2 persons
2	3-7 persons
4	8-15 persons
8	16-50 persons
12	50+ persons



ESTIMATE AND EVALUATE RISK

After hazards have been identified, the level of risk is estimated by considering the likelihood of a hazardous event occurring and the severity of the potential harm.

The **Hazard Rating Number (HRN)** is calculated using:

$$\text{HRN} = \text{LO} \times \text{FE} \times \text{DPH} \times \text{NP}$$

Where:

- LO = Likelihood of Occurrence
- FE = Frequency of Exposure
- DPH = Degree of Possible Harm
- NP = Number of Persons Exposed

HRN	Risk
0-5	Negligible
5-50	Low, significant
50-500	High
Over 500	Unacceptable

$$\text{HRN} = \text{LO} \times \text{FE} \times \text{DPH} \times \text{NP}$$

The calculated HRN is then used to determine the level of risk and whether further risk reduction measures are required.



RISK REDUCTION - INHERENTLY SAFE DESIGN

Once hazards and risks have been assessed, the designer must determine whether additional risk reduction measures are required.

Examples of inherently safe design measures:

Safe geometry	Sound engineering design
▪ Adequate clearances between moving parts ▪ Elimination of sharp edges	▪ Appropriate material selection ▪ Structural integrity and stability ▪ Selection of safer technologies
Limitation of hazardous characteristics	Human-centred design
▪ Force ▪ Speed ▪ Temperature	▪ Ergonomic design to reduce operator stress

Eliminating hazard at source is the most effective risk control.

ESTIMATE AND EVALUATE RISK

Hazard Type	Origin	Potential consequences	Comments	Initial Assessment					
				LO	FE	DPH	NP	HRN	Risk level
Mechanical hazards	Approach of a moving element to a fixed part	Being run over	N/A					0	Negligible
		Being thrown	N/A					0	Negligible
		Crushing	Tested to 17684	2	0.5	2	1	2	Negligible
		Cutting or severing	Tested to 17684	2	0.5	0.5	1	0.5	Negligible
		Drawing-in or trapping	Tested to 17684	2	0.5	0.5	1	0.5	Negligible
		Entanglement	Tested to 17684	2	0.5	0.5	1	0.5	Negligible
		Friction or abrasion	N/A					0	Negligible
		Impact	Tested to 17684	2	0.5	0.5	1	0.5	Negligible
		Injection	N/A					0	Negligible
		Shearing	Tested to 17684	2	0.5	0.5	1	1	Negligible
		Slipping, tripping, or falling	N/A					0	Negligible
		Stabbing or puncturing	Tested to 17684	1.5	0.5	0.5	1	1	Negligible
		Suffocation	N/A					0	Negligible



RISK REDUCTION - SAFEGUARDING AND PROTECTIVE MEASURES

Where hazards cannot be eliminated through design, additional protective measures should be applied.

Examples:

- Fixed guards
- Movable guards
- Interlocked guards
- Protective devices with safety functions
- Physical barriers and containment measures



RISK REDUCTION – INFORMATION FOR USE

Where residual risks remain, this must be communicated to the user:

On the machine

- Warning labels
- Safety signs

In the documentation

- Installation and commissioning instructions
- Operating instructions
- Maintenance and service information
- Transport and handling guidance



NEED FURTHER ASSISTANCE

Please contact info@fira.co.uk

We're here to help