



CE TECHNICAL FILE

Machine Name: High Tip Electric Dumper (ED 1500)

Issue Date: 30/06/2016

Revision: 1

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EU Declaration of Conformity

We,

EcoVolve Ltd

Of,

Dublin Road, Ballybrittas, Co. Laoise, Ireland

Declare under our sole responsibility as the body authorised to prepare the technical file for the product:

ED 1500 High Tip Electric Dumper

Complies with the applicable EHSR's of the **2006/42/EC – Machinery Directive and its amending directive**

We declare the technical file for this machine was compiled according to Appendix VII Part B and undertake to forward these to market monitoring authorities by request via our technical department. Commissioning of the machine is acceptable as it complies with the provisions of all applicable EC directives. This declaration is invalidated by any modification outside the scope of those indented by the manufacturer.

This declaration is invalidated by any modification outside the scope of those indented by the manufacturer.

For the intended purpose to

Handling and dumping of construction waste

Authorised representative for the compilation of the relevant technical documentation and issuer of EC Declaration of Conformity:

Signed: _____ Date: _____

EcoVolve Ltd

Dublin Road

Ballybrittas

Co Laoise

Ireland



Place of issue: **Republic of Ireland**

Revision Control

Rev No:	Issue Details:	Date of Issue:	Revision Author:
1	Initial Release	30/06/2016	ARC Management Systems

Verification & Validation

Stage	Conducted By	Signature (Hard Copy of File)	Date
Complied	Andrew Power	n/a	30/06/16

General Information

Machine Information	
Machine name:	ED 1500
Manufacturer:	EcoVolve
Machine Type:	ED 1500
Serial Number:	Listed in manufactures handbook per model.
Machine Certification:	CE Certificate

ARC Assessors / Assessment Date	
Initial risk Assessment Date:	June 2016
Assessor(s):	Andrew Power
Secondary Risk Assessment Date: (if applicable)	Additional inspection conducted in June.
Assessor(s):	Andrew Power
Risk Reduction Measure Assessment:	NA

Operator and Operational Information	
Cycle Time:	NA
Number of Operators:	1
Type of Training Received:	Operators manual.
Number of Control Stations:	1
Raw Materials Used:	No materials processed during operation.

Maintenance and Shut Down Information	
Isolation Device Installed:	Isolation Device present on Machine
Maintained By:	Machine owner as per manual.
Maintenance Schedule:	Indicated in manual.
Cleaning:	Indicated in manual.
Removal of Workpiece:	NA
House Keeping	Indicated in manual.

Determination of Machine Limitations	
Intended Environment:	Construction site or similar.
Physical Space Required:	See manufactures website for exact dimensions.
Required Training:	As per user and service manual.
Intended Operator:	Inexperience operator from associated profession.
Intended use:	The handling of construct and demolition waste.
Likely Misuse:	Horseplay / Loading of inappropriate materials.

Machine Control System Break Down & Description	
Number of Control Stations:	1
Normal Start:	Turn-key start.
Normal Stop:	Release of controls for general stop.
Emergency Stop:	Emergency Stop
Isolation Device:	Isolated through unit controls.
Reset:	Key reset, restart.
Machine Intelligence / Logic:	PLC
Machine Functionality / Control Description:	The machine is controlled by a PLC that has been programed by an engineer at Ecovolve Ltd.

General Description

Machine Technical specifications:	
Machine Name:	ED 1500
Control Circuit Voltage:	24 Volt DC
Mass (Kgs):	See manual
Other Energy Forms:	Hydraulic

Intended Use:

The machine is intend for the handling and transport of construction and demolitions waste in construction and industrial environments. It may also be used for the transport of general bulk materials within the performance limits of the machine in this same environment.

Annex I Special Clauses Checklist

The table below indicates whether or not the specific hazards listed apply to the machine:

Specific Hazards	Yes	No
Part 2 hazards specific to certain categories of machinery: - foodstuffs machinery (clause 2.1),		No
- machinery for cosmetics or pharmaceutical products (clause 2.1),		No
- hand-held and hand-guided machinery (clause 2.2),		No
- portable fixing machinery and other portable impact machinery (clause 2.2),		No
- machinery for working wood and material with similar characteristics (clause 2.3);		No
Part 3 hazards due to the mobility of machinery (clause 3);	Yes	
Part 4 hazards due to lifting operations (clause 4);		No
Part 5 hazards specific to machinery intended for underground work (clause 5);		No
Part 6 hazards due to the lifting of persons (clause 6).		No

Annex IV Checklist

The table below indicates whether or not the procedures referred to in Article 12(3) and (4) must be applied to the machine:

Categories of machinery to which one of the procedures referred to in Article 12(3) and (4) must be applied	Yes	No
1. Circular saws (single- or multi-blade) for working with wood and material with similar physical characteristics or for working with meat and material with similar physical characteristics, of the following types:		No
1.1. sawing machinery with fixed blade(s) during cutting, having a fixed bed or support with manual feed of the workpiece or with a demountable power feed;		
1.2. sawing machinery with fixed blade(s) during cutting, having a manually operated reciprocating saw-bench or carriage;		No
1.3. sawing machinery with fixed blade(s) during cutting, having a built-in mechanical feed device for the workpieces, with manual loading and/or unloading;		No
1.4. Sawing machinery with movable blade(s) during cutting, having mechanical movement of the blade, with manual loading and/or unloading.		No
2. Hand-fed surface planing machinery for woodworking.		No
3. Thicknessers for one-side dressing having a built-in mechanical feed device, with manual loading and/or unloading for woodworking.		No
4. Band-saws with manual loading and/or unloading for working with wood and material with similar physical characteristics or for working with meat and material with similar physical characteristics, of the following types:		No
4.1. sawing machinery with fixed blade(s) during cutting, having a fixed or reciprocating-movement bed or support for the workpiece;		
4.2. Sawing machinery with blade(s) assembled on a carriage with reciprocating motion.		No

5. Combined machinery of the types referred to in points 1 to 4 and in point 7 for working with wood and material with similar physical characteristics.		No
6. Hand-fed tenoning machinery with several tool holders for woodworking.		No
7. Hand-fed vertical spindle moulding machinery for working with wood and material with similar physical characteristics.		No
8. Portable chainsaws for woodworking.		No
9. Presses, including press-brakes, for the cold working of metals, with manual loading and/or unloading, whose movable working parts may have a travel exceeding 6 mm and a speed exceeding 30 mm/s.		No
10. Injection or compression plastics-moulding machinery with manual loading or unloading.		No
11. Injection or compression rubber-moulding machinery with manual loading or unloading.		No
12. Machinery for underground working of the following types:		No
12.1. Locomotives and brake-vans;		
12.2. Hydraulic-powered roof supports.		No
13. Manually loaded trucks for the collection of household refuse incorporating a compression mechanism.		No
14. Removable mechanical transmission devices including their guards.		No
15. Guards for removable mechanical transmission devices.		No
16. Vehicle servicing lifts.		No
17. Devices for the lifting of persons or of persons and goods involving a hazard of falling from a vertical height of more than three metres.		No
18. Portable cartridge-operated fixing and other impact machinery.		No
19. Protective devices designed to detect the presence of persons.		No
20. Power-operated interlocking movable guards designed to be used as safeguards in machinery referred to in points 9, 10 and 11.		No
21. Logic units to ensure safety functions.		No
22. Roll-over protective structures (ROPS).		No
23. Falling-object protective structures (FOPS).		No

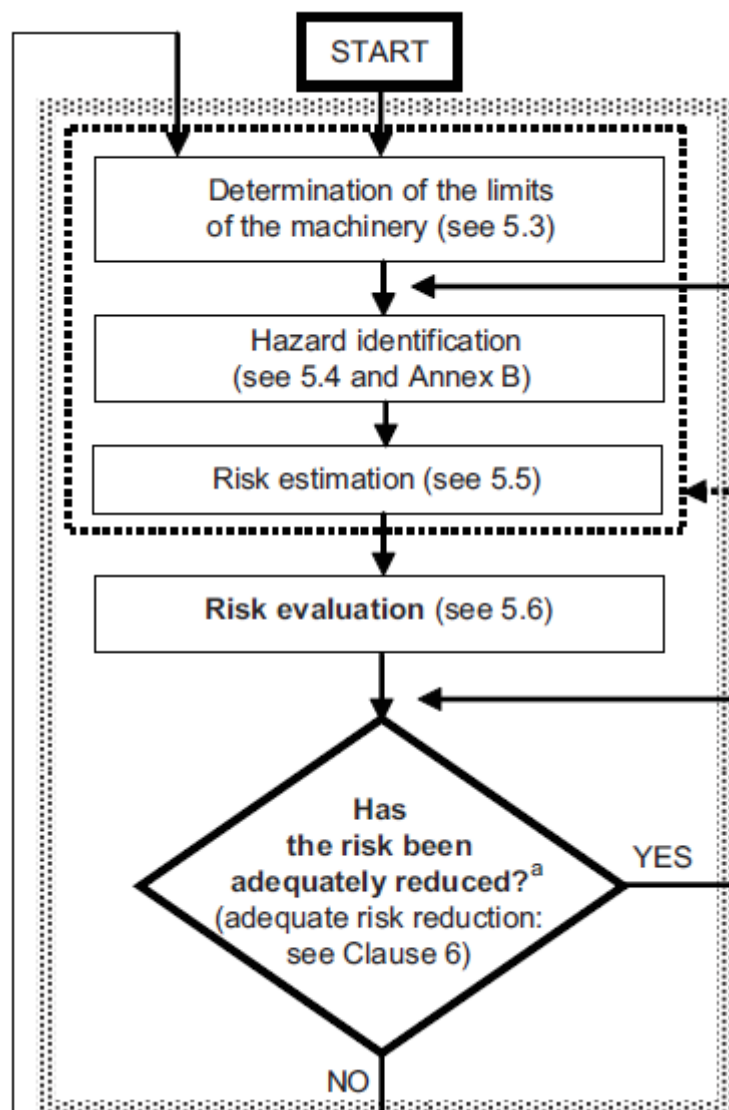
Risk Assessment Process

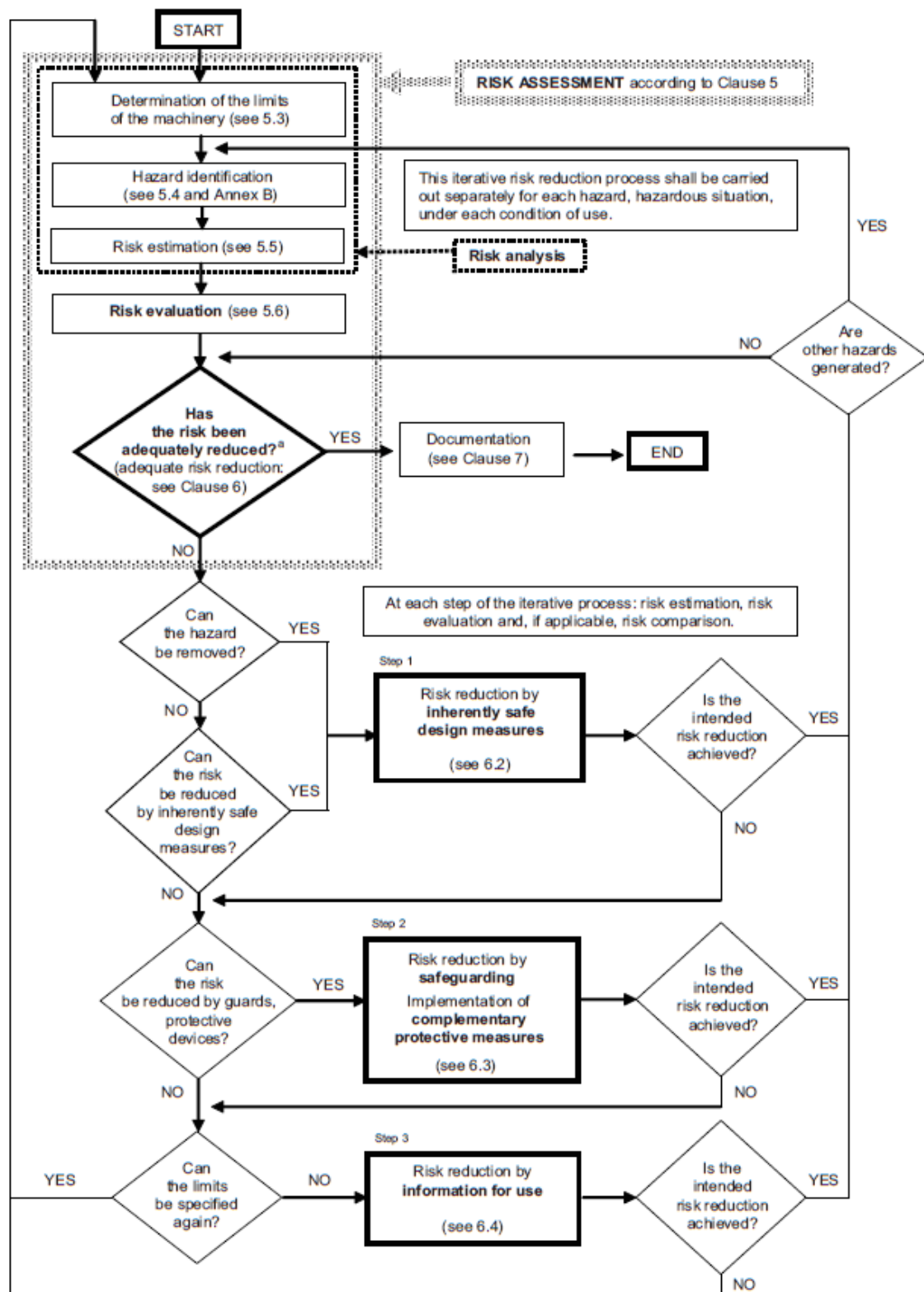
Risk Assessment – Flow

The diagram below outlines the Hazard Identification and Risk Assessment process. It is an iterative process that involves identification of the hazard, deciding if remedial action is required, selecting the hazard control and re-evaluating until an acceptable risk has been achieved.

It is important to repeat the hazard identification process after controls have been selected because the controls may introduce a new hazard.

For a hazard checklist (not exhaustive) see EN ISO 12100:2010





^a The first time the question is asked, it is answered by the result of the initial risk assessment.

Figure 1 — Schematic representation of risk reduction process including iterative three-step method

Risk Assessment – Procedure

The risk assessment process involves the following:

- Identifying the significant hazards present in the workplace, which is conducted using the following methodologies:
 - Using the organisation chart as a guide, listing of all task conducted by each individual on the organisation chart.
 - Review each task as listed above for potential risk.
 - Legislative requirements.
 - Site audits.

- Identifying what groups of people are most affected by those hazards e.g. employees, service users, contractors and visitors.

- Listing the current controls in place.

- Recording the likelihood and severity of injury/illness associated with the hazard. Calculating the risk assessment number is arrived at by the addition of the severity + frequency + possibility of avoidance.

- Recommending additional controls in order to ensure that risks are reduced to the lowest level reasonably practicable (see hierarchy of controls below).

- Designating a member of staff to co-ordinate the implementation of additional controls. Stating a date when action should be complete and recording when that action has been completed.

- The length of time specified for implementing control measures will vary and be dependent on the risk rating for the hazard i.e. the higher the risk, the faster action should be taken. If additional control measures reduce the likelihood or severity of injury, a revised risk rating can be recorded.

Hierarchy of Controls

The selection and implementation of the most appropriate method of risk or hazard control is a crucial part of the risk assessment process. The following hierarchy should be used when deciding on control measures, starting with the first in the list and working down to the last resort, which is the provision of personal protective equipment and clothing.

Elimination:

- Eliminating the hazard entirely from the workplace is the best way to control it. Examples of this would be providing a lifting device, which eliminates the need to carry out manual handling or disposing of unwanted chemicals.

Substitution:

- If not possible to eliminate the hazard, replace it with something less hazardous, which will perform the same task in a satisfactory manner. Examples are substituting a hazardous chemical with a less toxic one or substituting a smaller package or container to reduce the risk of manual handling injuries.

Engineering Solutions:

- If the hazard cannot be eliminated or a safer substitute implemented, then reduce the chance of hazardous contact. Examples of engineering controls are:
 - enclosure (enclose in a way that eliminates or controls the risk);
 - guarding/segregation of people;
 - interlocks and cut-off switches; and
 - Exhaust fans.

Administrative Solutions:

- These are the management strategies, which can be introduced, training, job rotation, limitation of exposure time, provision of written work procedures. For example:
 - safe systems of work that reduce the risk to an acceptable level;
 - written procedures that are known and understood by those affected;
 - adequate supervision;
 - identification of training needs and provision of appropriate training; and
 - Information/instruction (signs, hand-outs).

Personal Protective Equipment & Clothing:

- Personal Protective Equipment and Clothing should always be considered as a last resort. PPE can also be used as an interim measure to reduce exposure to a hazard. Some examples of PPE include; masks, ear plugs, respirators, helmets, boots, safety shoes, overalls, etc.

The most effective way to control risk is obviously to remove it. Elimination is by definition 100% effective. The further you go down the list the less effective the methods become. Training for example has been estimated as being only 10% effective. It is also worth bearing in mind that the amount of management and supervisory effort needed to maintain the controls is in inverse rank order. In other words, item 5 takes the most effort to maintain and item 1 the least effort.

Risk Assessment – Guide

(Based on EN ISO 12100:2010)

Severity + Frequency + Possibility of avoidance = Risk assessment number.

Severity Scale:

What is the worst injury that can result from exposure to the hazard?

5 = Death.

4 = Non-fatal serious injury e.g. loss of limbs.

3 = Serious injury e.g. broken arm.

2 = Serious cuts and bruises.

1 = Minor cuts and bruises.

Frequency Scale:

How often are personnel exposed to the hazard under assessment?

5 = All the time.

4 = Several times a shift.

3 = Once a week.

2 = Once a month.

1 = Once a year.

Possibility of avoidance scale:

How likely it is that personnel will be able to avoid the hazard.

5 = No possibility of avoidance.

4 = Possibility of avoidance. (Under certain circumstances).

3 = Good chance of avoidance.

2 = Significant chance.

1 = Certainty of avoidance.

Possibility of occurrence of hazardous event scale:

How likely is the possibility of occurrence of the hazardous event.

5 = certain chance of Occurrence.

4 = Probable of occurrence. (Under certain circumstances).

3 = Possible chance of occurrence.

2 = Unlikely chance of occurrence.

1 = Almost impossible chance of occurrence.

The total score for a particular hazard indicates the following:

0 - 5 = Minor hazard.....Requires minor or no corrective action.

6 - 10 = Moderate hazard.....Requires corrective action as soon as possible.

11 - 15 = Significant hazard.....Requires action at next suitable opportunity.

15 - 20 = Serious hazard.....Requires immediate action.

Scale Key:

S = Severity

L = Likely hood

A = Avoidance

O = Occurrence

T = Total

Note:

Following the initial risk assessment and the application of the appropriate control measures a further risk assessment is carried out taking into consideration the influence of the newly installed control measures on the machine/device.

Risk Assessment – Summary Report

Please see below the required changes to the machine. These changes are to be implemented and inspected before the machine can be considered CE marked.

The below risks have been identified in the risk assessment, for further details on the risk rating and the associated machinery directive clause please refer to the machine technical file.

Minor Hazard – Requires minor or no corrective action		
Risk Rating	MD Clause No	Description
Note: All aspects of the machine are minor hazards apart from those listed in Moderate and Serious Risk categories below.		

Moderate Hazard – Requires corrective action as soon as possible		
Risk Rating	MD / LVD Clause No	Description
10	1.1.7	Due to the placement of the warning beacon it can be obscured by the bucket.
8	1.7.1.2	A scenario may arise where the operator, who is standing on the platform of the machine, is turning the machine in a full locked turn at full speed. If the operator activate the E-Stop in this situation and the side rail guards are down then the operator may fall off the machine.

Significant Hazard – Requires corrective action as soon as possible		
Risk Rating	MD Clause No	Description

Serious Hazard – Requires immediate action		
Risk Rating	MD Clause No	Description

The above are the risks identified with this machine at time of inspection. These issues with the machine will have to be dealt with and closed out before the machine in question can be considered CE marked.

Hazard Analysis – Summary Report

The below hazards have been identified in the risk assessment, for further details on the hazard please refer full hazard report referenced by number.



Minor Hazard – Requires minor or no corrective action		
Risk Rating	Hazard No.	Description
Note: All aspects of the process are minor hazards apart from those listed in Moderate and Serious Risk categories below.		



Moderate Hazard – Requires corrective action as soon as possible		
Risk Rating	Hazard No.	Description
10	HAZ01	Due to the placement of the warning beacon it can be obscured by the bucket.
8	HAZ02	A scenario may arise where the operator, who is standing on the platform of the machine, is turning the machine in a full locked turn at full speed. If the operator activate the E-Stop in this situation and the side rail guards are down then the operator may fall off the machine.

Significant Hazard – Requires corrective action as soon as possible		
Risk Rating	Hazard No.	Description

Serious Hazard – Requires immediate action		
Risk Rating	Hazard No.	Description

Hazard Analysis Report

Title	Location of beacon		Hazzard ID	HAZ-001	
Location			Picture		
					
Machine	ED 1500		Activity	Normal Operation	
Process	General Operation		Task	General Operation	
Target	General		Hazzard Type	Impact	
Description					
Due to the placement of the warning beacon it can be obscured by the bucket. (note the ED 800 is pictured but relevant in the description)					
Risk Estimation & Evaluation					
Severity	Frequency	Possibility of Avoidance	Possibility of Occurrence	Total	
3	3	2	2	10	
Risk Reduction					References
Additional beacons need to be placed on the machine or the beacon needs to be elevated to improve its functionality.					NA
Possible Residual Risk					
Severity	Frequency	Possibility of Avoidance	Possibility of Occurrence	Total	
1	1	1	1	4	

Title		Possible inertia of operator when activation E-Stop		Hazzard ID		HAZ-002	
Location				Picture			
							
Machine	ED 1500			Activity	Normal Operation		
Process	General Operation			Task	General Operation		
Target	General			Hazzard Type	Impact		
Description							
<p>A scenario may arise where the operator, who is standing on the platform of the machine, is turning the machine in a full locked turn at full speed. If the operator activate the E-Stop in this situation and the side rail guards are down then the operator may fall off the machine. (note the ED 800 is pictured but relevant in the description)</p>							
Risk Estimation & Evaluation							
Severity	Frequency	Possibility of Avoidance	Possibility of Occurrence	Total			
3	1	2	2	8			
Risk Reduction						References	
<p>Clear advice is to be provided to the operator in the user and service instructions that the machine is not to be operated in the ride on mode while the side rails are down.</p>						NA	
Possible Residual Risk							
Severity	Frequency	Possibility of Avoidance	Possibility of Occurrence	Total			
1	1	1	1	4			

Risk Assessment - Machinery Directive 2006/42/EC

1.0 Essential Health and Safety Requirements

1.1 General Remarks

1.1.2 – Principles of Safety Integration

Clause Requirements

- a) Machinery must be designed and constructed so that it is fitted for its function and can be operated, adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen but also taking into account any reasonably foreseeable misuse thereof.
The aim of measures taking must be to eliminate any risk throughout the foreseeable lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.
- b) In selecting the most appropriate methods, the manufacturer or his authorised representative must apply the following principles, in order given:
- I. Eliminate or reduce risks as far as possible (inherently safe machinery design and construction).
 - II. Take the necessary protective measures in relation to risks that cannot be eliminated.
 - III. Inform users of the residual risks due to any shortcomings of the protective measures adopted, indicate whether any particular training is required and specify any need to provide personal protective equipment.
- c) When designing and constructing machinery and when drafting the instructions, the manufacturer or his authorised representative must envisage not only the intended use of the machinery but also any reasonably foreseeable misuse thereof.
The machinery must be designed and constructed in such a way as to prevent abnormal use would engender a risk. Where appropriate, the instructions must draw the user's attention to ways – which experience has shown might occur – in which the machinery should not be used.
- d) Machinery must be designed and constructed to take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protective equipment.

Machinery must be supplied with all the special equipment and accessories essential to enable it to be adjusted, maintained and used safely.

Questions

1. Has the machinery been designed and constructed to ensure that it is fitted for its function and can be operated, adjusted and maintained without putting persons at risk when these operations are

carried out under the conditions foreseen but also taking into account any reasonably foreseeable misuse?

Response: The machine has been designed and constructed so that it is fitted for its function and can be operated, adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen but also taking into account any reasonably foreseeable misuse.

2. Has the manufacturer or the authorised representative applied the following principles,
- Eliminate or reduce risks as far as possible (inherently safe machinery design and construction).
 - Take the necessary protective measures in relation to risks that cannot be eliminated.
 - Inform users of the residual risks due to any shortcomings of the protective measures adopted, indicate whether any particular training is required and specify any need to provide personal protective equipment?

Response: The manufacturer has, where applicable, met the necessary requirements for the principles outlined from I)-III).

3. When designing and constructing machinery and when drafting the instructions, has the manufacturer or his authorised representative envisaged not only the intended use of the machinery but also any reasonably foreseeable misuse thereof?

Response: When designing and constructing machine and when drafting the instructions, the manufacturer or his authorised representative has envisaged and made designed accordingly to tolerate not only the intended use of the machinery but also any reasonably foreseeable misuse of the machine.

3. Machinery must be designed and constructed to take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protective equipment?

Response: The machine has been designed and constructed to take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protective equipment.

4. Has the machinery been supplied with all the special equipment and accessories essential to enable it to be adjusted, maintained and used safely?

Response: The machine has been supplied with all the necessary special equipment and accessories essential to enable it to be adjusted, maintained and used safely.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Failure of components and/or total machine failure.	Substandard materials used.	1	1	1	1	4	None Identified.

1.1.3 - Material & Products

Clause Requirements

The materials used to construct machinery or products used or created during its use must not endanger persons' safety or health. In particular, where fluids are used, machinery must be designed and constructed to prevent risks due to filling, use, recovery or draining¹.

Questions

1. Has the appropriate material been used to construct the machinery or any products used or created during its use to ensure no person is endangered?

Response: The appropriate materials have been used in the construction of the machine. No product used or created during the use of the machine will endanger any persons working in the vicinity of the machine.

2. Where fluids have been used, has the machinery been designed and constructed to prevent all risks associated with filling, use, recovery and draining?

Response: Where fluids have been employed, all risks associated with hazards relating to filling, use, recovery and drainage do not pose a risk due to the design and construction of the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Failure of components and/or total machine failure.	Substandard materials used.	1	1	1	1	4	None Identified.

1.1.4 - Lighting

Clause Requirements

Machinery must be supplied with integral lighting suitable for the operations concerned where the absence thereof is likely to cause a risk despite ambient lighting of normal intensity^{1&2}.

Machinery must be designed and constructed so that there is no area of shadow likely to cause nuisance², that there is no irritating dazzle and that there are no dangerous stroboscopic effects on moving parts due to the lighting^{3&4}.

Internal parts requiring frequent inspection and adjustment, and maintenance areas must be provided with appropriate lighting.

Questions

1. Is lighting supplied with the machine?

Response: Lighting is supplied on the machine.

2. Is the lighting sufficient for the machine?

Response: The lighting provided on the machine is sufficient for its intended purpose. Note that lights should be inspected to be clean and in working order before use as per the manual, page 17.

3. Is there any shadows that might cause a nuisance?

Response: No shadows are present to cause a nuisance to the operator.

4. Is there any flashing or dazzling lights on the machine?

Response: There is no flashing or dazzling lights on the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Failure of components and/or total machine failure.	Substandard materials used.	1	1	1	1	4	None Identified.
Poor inspection of internal components.	Ineffective or insufficient internal lighting.						

1.1.5 - Design of Machinery to Facilitate it's Handling

Clause Requirements

Machinery, or each component part thereof, must:

- be capable of being handled and transported safely,
- be packaged or designed so that it can be stored safely and without damage¹.

During the transportation of the machinery and/or its component parts, there must be no possibility of sudden movements or of hazards due to instability as long as the machinery and/or its component parts are handled in accordance with the instructions.

Where the weight, size or shape of machinery or its various component parts prevents them from being moved by hand, the machinery or each component part must:

- either be fitted with attachments for lifting gear, or
- be designed so that it can be fitted with such attachments, or
- be shaped in such a way that standard lifting gear can easily be attached².

Where machinery or one of its component parts is to be moved by hand, it must:

- either be easily moveable, or
- be equipped for picking up and moving safely.

Special arrangements must be made for the handling of tools and/or machinery parts which, even if lightweight, could be hazardous.

Questions

1. Can the machine or parts of the machinery, which may be handled be easily transported, and is it manual or mechanical transportation?

Response: Transport of the machine is possible as per the instructions of the user and service manual.

2. Is the machine or parts of the machinery, which may be handled packaged or designed so that it can be stored safely and without damage?

Response: This machine can be stored as per the user and service instructions.

3. Has the machine or parts of the machinery, which may be handled been designed in such a way that will allow it to be lifted/ moved?

Response: The machine can be lifted using the lifting points indicated on the machine.

4. Have instructions been provided to enable safe transportation?

Response: Instructions have been included in the manual for the movement and transport of the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inability to store machinery in an efficient and safe manner.	Storage method hasn't been properly designed.	1	1	1	1	4	None Identified.
Danger to others during transport.	Inability to cover or store						

	dangerous components.						
Dangerous to lift or transport	No/poor provision of lifting fitting						

1.1.6 - Ergonomics

Clause Requirements

Under the intended conditions of use, the discomfort, fatigue and physical and psychological stress faced by the operator must be reduced to the minimum possible, taking into account ergonomic principles such as:

- Allowing for the variability of the operator's physical dimensions, strength and stamina¹,
- Providing enough space for movements of the parts of the operator's body,
- avoiding a machine-determined work rate²,
- avoiding monitoring that requires lengthy concentration³,
- adapting the man/machinery interface to the foreseeable characteristics of the operators.

Questions

1. Has the machine been designed with the operator's dimensions in mind?

Response: The machine has been designed ergonomically with the operator's dimensions in mind.

2. Is there enough space provided for movements of the parts of the operator's body?

Response: There is enough space provided for movements of the parts of the operator's body.

3. Does the machine determine the work rate?

Response: The machine does not determine the work rate. It is up to the operator's discretion to determine the work rate.

4. Are rest breaks at the operator's discretion?

Response: Rest breaks are at the discretion of the operator.

5. Is the man/machinery interface adaptable to the foreseeable characteristics of the operators?

Response: The devices controls are external and set at a reasonable height for operator.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Stress or strain due to control setup and layout	Lack of consideration for ergonomic principles	1	1	1	1	4	None Identified.
Stress or strain due to operator position	Lack of consideration for ergonomic principles						
Danger due to machine controlled work rate	Lack of variable or user controls						

1.1.7 - Operating Position

Clause Requirements

The operating position must be designed and constructed in such a way as to avoid any risk due to exhaust gases and/or lack of oxygen¹.

If the machinery is intended to be used in a hazardous environment presenting risks to the health and safety of the operator or if the machinery itself gives rise to a hazardous environment, adequate means must be provided to ensure that the operator has good working conditions and is protected against any foreseeable hazards².

Where appropriate, the operating position must be fitted with an adequate cabin designed, constructed and/or equipped to fulfil the above requirements. The exit must allow rapid evacuation. Moreover, when applicable, an emergency exit must be provided in a direction which is different from the usual exit³.

Questions

1. Is the operator position situated appropriately and free from any hazardous gases or material which be exhausted from the machine?

Response: The operator position is situated appropriately, free from all hazardous gases and materials. Escape routes are unimpeded.

2. Is the operator protected from potential risks that could be avoided with guarding etc.?

Response: The operator may experience risk related to the inertia of a high speed stop during a turn. This has been reduced by guarding to with side of the operators position.

3. If a cabin is part of the design, is it designed appropriately?

Response: There is no cabin per say on this machine, but it does feature a suitably designed platform.

4. Does the cabin's exit allow rapid evacuation?

Response: There is no cabin included in the design of the machine.

5. Is an emergency exit provided in a direction which is different from the usual exit?

Response: An emergency exit is not required for this machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inhalation of exhaust fumes	Fumes exhausted in close proximity to driver cabin						Driver is to be aware of the result of hitting the estop, and must be fully versed on the contents of the user and service manual.
Danger to operator due to exposure to danger working components	Lack of adequate protection in driver/ operator position	3	3	2	2	10	
Becoming trapped in driver position or cabin	Lack of sufficient escape routes						

1.1.8 - Seating

Clause Requirements

Where appropriate and where the working conditions so permit, work stations constituting an integral part of the machinery must be designed for the installation of seats.

If the operator is intended to sit during operation and the operating position is an integral part of the machinery, the seat must be provided with the machinery.

The operator's seat must enable him to maintain a stable position. Furthermore, the seat and its distance from the control devices must be capable of being adapted to the operator.

If the machinery is subject to vibrations, the seat must be designed and constructed in such a way as to reduce the vibrations transmitted to the operator to the lowest level that is reasonably possible. The seat mountings must withstand all stresses to which they can be subjected. Where there is no floor beneath the feet of the operator, footrests covered with a slip-resistant material must be provided.

Questions

1. Where appropriate and where the working conditions so permit, are work stations constituting an integral part of the machinery designed for the installation of seats?

Response: There is no seating required with this machine.

2. Does the operator's seat enable him to maintain a stable position?

Response: There is no seating required with this machine.

3. Is the seat and its distance from the control devices capable of being adapted to the operator?

Response: There is no seating required with this machine.

4. If the machinery is subject to vibrations, is the seat designed and constructed in such a way as to reduce the vibrations transmitted to the operator to the lowest level that is reasonably possible?

Response: There is no seating required with this machine.

5. Can the seat mountings withstand all stresses to which they can be subjected?

Response: There is no seating required with this machine.

6. Where there is no floor beneath the feet of the operator, are footrests covered with a slip-resistant material provided?

Response: There is no seating required with this machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Stress or strain due to seat position	Lack of consideration for ergonomic principles	1	1	1	1	4	None Identified.
Stress or strain due to operator position	Lack of consideration for ergonomic principles						
Vibration damage to the operator or	Lack of vibration dampening between the						

surrounding environment	machine and the operators position						
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1.2 Control Systems

1.2.1 - Safety & Reliability of Control Systems

Clause Requirements

Control systems must be designed and constructed in such a way as to prevent hazardous situations from arising. Above all, they must be designed and constructed in such a way that:

- a) they can withstand the intended operating stresses and external influences,
- b) a fault in the hardware or the software of the control system does not lead to hazardous situations,
- c) errors in the control system logic do not lead to hazardous situations,
- d) Reasonably foreseeable human error during operation does not lead to hazardous situations¹.

Particular attention must be given to the following points:

- the machinery must not start unexpectedly²,
- the parameters of the machinery must not change in an uncontrolled way, where such change may lead to hazardous situations,
- the machinery must not be prevented from stopping if the stop command has already been given,
- no moving part of the machinery or piece held by the machinery must fall or be ejected,
- automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,
- the protective devices must remain fully effective or give a stop command³,
- 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.

For cable-less control, an automatic stop must be activated when correct control signals are not received, including loss of communication.

Questions

1. Is the machines control system designed and constructed in such a way that the following does not present a hazardous situation:

- a) they can withstand the intended operating stresses and external influences
- b) a fault in the hardware or the software of the control system does not lead to hazardous situations
- c) errors in the control system logic do not lead to hazardous situations
- d) reasonably foreseeable human error during operation does not lead to hazardous situations

Response: The machines control system is designed and constructed in such a way that the hazards ((a)-(c)). Point d is a cause for concern with the machine lacking adequate markings to explain the function of the controls.

2. The machinery must not start unexpectedly.

Response: The machinery cannot be moved or repositioned unexpectedly. The machine cannot be started without user input.

3. Do the parameters of the machinery change in an uncontrolled way, where such a change may lead to hazardous situations?

Response: The parameters of the machinery do not change in an uncontrolled way, where such a change may lead to hazardous situations.
4. Does the control system have a redundant architecture and if so, have the necessary feature been included to select the fault or failure as that the necessary action can be taken to achieve or maintain a safe state?
Response: The machine has a simple control system and does not have a redundant architecture.
5. Is the machinery prevented from being stopped if the stop command has already been given?
Response: The machinery is not prevented from being stopped if the stop command has already been given.
6. Can any moving part of the machinery or piece held by the machinery fall or be ejected?
Response: Any moving part of the machinery or piece held by the machinery cannot fall or be ejected.
7. Automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded?
Response: Automatic or manual stopping of the moving parts, whatever they may be is unimpeded.
8. Do protective devices remain fully effective or give a stop command.
Response: Protective devices remain effective on this machine and a stop block has been provided.
9. Do the safety-related parts of the control system apply in a coherent way to the whole of an assembly of machinery and/or partly completed machinery?
Response: The required functions are present for a coherent, whole system integration, the installer must comply with user and service installation instructions to ensure coherent safe operation.
10. For cable-less control is an automatic stop activated when correct control signals are not received, including loss of communication?
Response: The wireless control method accessory is excluded from the scope of this assessment as identified during the site visit.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Failure of control components prevents shutdown	Lack of separate emergency shut off.	1	1	1	1	4	None Identified.
In ability to avoid dangerous situations created by foreseeable human error	Systems not in place to prevent avoidable human error.						
Accidental activation of components or machinery	Insufficient safety guards provided						

1.2.2 - Control Devices

Clause Requirements

Control devices must be:

- Clearly visible and identifiable and appropriately marked where necessary¹,
- Positioned for safe operation without hesitation or loss of time, and without ambiguity,
- Designed so that the movement of the control is consistent with its effect,
- Located outside the danger zones, except for certain controls where necessary, such as emergency stop, console for training of robots,
- Positioned so that their operation cannot cause additional risk,
- Designed or protected so that the desired effect, where a risk is involved, cannot occur without an intentional operation,
- Made so as to withstand foreseeable strain; particular attention must be paid to emergency stop devices liable to be subjected to considerable strain.

Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence (e.g. keyboards, etc.), the action to be performed must be clearly displayed and subject to confirmation where necessary.

Controls must be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles². Constraints due to the necessary or foreseeable use of personal protection equipment (such as footwear, gloves, etc.) must be taken into account.

Machinery must be fitted with indicators (dials, signals, etc.) as required for safe operation. The operator must be able to read them from the control position³.

From the main control position the operator must be able to ensure that there are no exposed persons in the danger zones⁴.

If this is impossible, the control system must be designed and constructed so that an acoustic and/ or visual warning signal is given whenever the machinery is about to start. The exposed person must have the time and the means to take rapid action to prevent the machinery starting up.

If necessary, means must be provided to ensure that the machinery can be controlled only from control positions located in one or more predetermined zones or locations.

Where there is more than one control position, the control system must be designed in such a way that the use of one of them precludes the use of the others, except for stop controls and emergency stops.

When machinery has two or more operating positions, each position must be provided with all the required control devices without the operators hindering or putting each other into a hazardous situation.

Questions

1. Are the control devices appropriately positioned and marked?

Response: The control devices are appropriately positioned and marked.

2. Are the control device(s) appropriately designed e.g. ergonomically?							
Response: Controls are very simple, ergonomic and easily operated.							
3. Are the control devices located outside the danger zones except for certain controls where necessary, such as emergency stop, console for training of robots?							
Response: The control devices are located outside the danger zones.							
4. Are the control devices positioned so that their operation cannot cause additional risk?							
Response: Controls are positioned in the appropriate places.							
5. Are the control devices designed or protected so that the desired effect, where a risk is involved, cannot occur without an intentional operation?							
Response: The control devices are designed or protected so that the desired effect, where a risk is involved, cannot occur without an intentional operation.							
6. Are the control devices made so as to withstand foreseeable strain; particular attention must be paid to emergency stop devices liable to be subjected to considerable strain?							
Response: The control devices are made so as to withstand foreseeable strain.							
7. Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence (e.g. keyboards, etc.), is the action to be performed clearly displayed and subject to confirmation where necessary?							
Response: The function of controls with multiple uses are clearly identified and labelled on the machine and detailed instructions provided in the manual.							
8. Are controls arranged so that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles? Constraints due to the necessary or foreseeable use of personal protection equipment (such as footwear, gloves, etc.) must be taken into account?							
Response: The controls are arranged so that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles.							
9. Are there appropriate indicators on the machine that are easily readable and understandable?							
Response: The appropriate indicators have been fitted to the machine and they are easily readable and understandable.							
10. Is the operator able to see all the danger zones when the machine is in operation?							
Response: All danger zones are clearly visible to the operator at all times.							
11. If it is impossible for the operator to ensure that there is no exposed persons in the danger zones is the control system designed and constructed so that an acoustic and/or visual warning is given whenever the machinery is about to start and has the exposed person the time and the means to take rapid action to prevent the machinery starting up?							
Response: The operator is able to ensure that there are no exposed persons in the danger zones.							
12. Have means been provided to ensure that the machinery can be controlled only from control positions located in one or more predetermined zones or locations?							
Response: The machine has only one control position.							
13. Where there is more than one control position, the control system must be designed in such a way that the use of one of them precludes the use of the others, except for stop controls and emergency stops.							
Response: The machine has one control station.							
14. When machinery has two or more operating positions, each position must be provided with all the required control devices without the operators hindering or putting each other into a hazardous situation.							
Response: The machine has one control station.							
Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	

Accidental Activation of machinery	Lack of safety cut off or over ride	1	1	1	1	4	None Identified.
Danger requiring emergency or immediate halt of action	Inability to stop machine action.						
Danger to operator in accessing machine controls.	Unsafe positioning of machine controls.						
Danger to those accidently entering machines operation radius.	Inability to observe operational area from intended position of operation.						
Failure of controls.	Substandard materials or poorly maintained controls.						
Accidental activation or improper activation	Lack of sufficient labelling to identify controls intended function.						
Persons entering danger zone of machines operation	Lack of sufficient audio/visual information that machine is in operation.						

1.2.3 - Starting

Clause Requirements

It must be possible to start machinery only by voluntary actuation of a control device provided for the purpose.

The same requirement applies:

- when restarting the machinery after a stoppage, whatever the cause,
- When effecting a significant change in the operating conditions¹.

However, the restarting of the machinery or a change in operating conditions may be effected by voluntary actuation of a device other than the control device provided for the purpose, on condition that this does not lead to a hazardous situation.

For machinery functioning in automatic mode, the starting of the machinery, restarting after a stoppage, or a change in operating conditions may be possible without intervention, provided this does not lead to a hazardous situation.

Where machinery has several starting control devices and the operators can therefore put each other in danger, additional devices must be fitted to rule out such risks². 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.

Questions

1. Can the machinery only be started by a voluntary action, also after stoppage and when changing the operating conditions?

Response: The machine can only be moved through intentional action of the operator.

2. Can the release closing of an interlocked guard, release of a stop control or the release of an emergency stop cause an unexpected restart?

Response: Closing of an interlocked guard, releasing a stop control or release an emergency stop cannot lead to a hazardous situation.

3. For machinery functioning in automatic mode, can the starting of the machinery, restarting after a stoppage, or a change in operating conditions be possible without intervention, provided this does not lead to a hazardous situation?

Response: Machine does not feature an automatic mode.

4. For multi starting point machines is there appropriate devices fitted so as to avoid hazardous situations?

Response: The machine has a single starting point.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Accidental activation	Controls are such that accidental activation may occur	1	1	1	1	4	None Identified.

1.2.4 – Stopping Device

1.2.4.1 - Normal Stop

Clause Requirements

Machinery must be fitted with a control device whereby the machinery can be brought safely to a complete stop. Each workstation must be fitted with a control device to stop some or all of the functions of the machinery, depending on the existing hazards, so that the machinery is rendered safe. The machinery's stop control must have priority over the start controls. Once the machinery or its hazardous functions have stopped, the energy supply to the actuators concerned must be cut off¹.

Questions

1. Has the machine been fitted with a normal stop button?

Response: The machine will come to a stop if the controls are release. The stop is controlled and gradual.

2. Will the activation of a stop command bring the machine to a safe and complete stop?

Response: The machines normal stop function will bring it to a gradual and complete safe stop.

3. Has each workstation been fitted with a control device to stop some or all of the functions of the machinery, depending on the existing hazards, so that the machinery is rendered safe?

Response: The machine features a single workstation.

4. Does the machinery's stop command take priority over the start command?

Response: The machines stop command takes priority when issued.

5. Once the machinery or its hazardous functions have stopped, is the energy supply to the actuators concerned cut off?

Response: Once the machinery or its hazardous function has been stopped, the energy supply to the actuators has been cut off.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inability to stop the machine when required.	Non response of machine.	1	1	1	1	4	None Identified.
Inability to stop the machine in an emergency situation.	Failure due to incorrect assembly						

1.2.4.2 – Operational Stop

Clause Requirements

Where, for operational reasons, a stop control that does not cut off the energy supply to the actuators is required, the stop condition must be monitored and maintained.

Questions

1. Where, for operational reasons, a stop control that does not cut off the energy supply to the actuators is required, is the stop condition monitored and maintained?

Response: The machines operational stop will bring the machine to a complete gradual safe stop.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inability to stop the machine when required.	Non response of machine.	1	1	1	1	4	None Identified.
Inability to stop the machine in an emergency situation.	Failure due to incorrect assembly						

1.2.4.3 - Emergency Stop

Clause Requirements

Machinery must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted².

The following exceptions apply:

- machinery in which an emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would not enable the special measures required to deal with the risk to be taken,
- Portable hand-held and/or hand-guided machinery.

The device must:

- have clearly identifiable, clearly visible and quickly accessible control devices,
- stop the hazardous process as quickly as possible, without creating additional risks,
- Where necessary, trigger or permit the triggering of certain safeguard movements.

Once active operation of the emergency stop device has ceased following a stop command, that command must be sustained by engagement of the emergency stop device until that engagement is specifically overridden; it must not be possible to engage the device without triggering a stop command; it must be possible to disengage the device only by an appropriate operation, and disengaging the device must not restart the machinery but only permit restarting³.

The emergency stop function must be available and operational at all times, regardless of the operating mode.

Emergency stop devices must be a back-up to other safeguarding measures and not a substitute for them.

Questions

1. Has the machine been fitted with an appropriate emergency stop button?

Response: The machine has been fitted with an appropriate emergency stop button.

2. Once the emergency stop has been activated, it must have to be manually reset before operations can begin again.

Response: The emergency stop is manually reset.

3. Is the emergency stop device easily identifiable and readily accessible?

Response: The emergency stopping device is easily identifiable and readily accessible.

4. The machine must not automatically restart after the emergency stop has been deactivated.

Response: The emergency stop will not automatically restart.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inability to stop the machine when required.	Non response of machine.	1	1	1	1	4	

Inability to stop the machine in an emergency situation.	Failure due to incorrect assembly						
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1.2.4.4 - Assembly of Machinery
Clause Requirements

In the case of machinery or parts of machinery designed to work together, the machinery must be designed and constructed in such a way that the stop controls, including the emergency stop devices, can stop not only the machinery itself but also all related equipment, if its continued operation may be dangerous.

Questions

1. In the case of machinery or parts of machinery designed to work together, is the machinery designed and constructed in such a way that the stop controls, including the emergency stop devices, can stop not only the machinery itself but also all related equipment, if its continued operation may be dangerous?

Response: The machine is a standalone piece of equipment.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inability to stop the machine when required.	Non response of machine.	1	1	1	1	4	None Identified.
Inability to stop the machine in an emergency situation.	Failure due to incorrect assembly						

1.2.5 - Selection of Control or Operating Modes

Clause Requirements

The control or operating mode selected must override all other control or operating modes, with the exception of the emergency stop. If machinery has been designed and constructed to allow its use in several control or operating modes requiring different protective measures and/or work procedures, it must be fitted with a mode selector which can be locked in each position. Each position of the selector must be clearly identifiable and must correspond to a single operating or control mode.

The selector may be replaced by another selection method which restricts the use of certain functions of the machinery to certain categories of operator.

If, for certain operations, the machinery must be able to operate with a guard displaced or removed and/or a protective device disabled, the control or operating mode selector must simultaneously:

- disable all other control or operating modes,
- permit operation of hazardous functions only by control devices requiring sustained action,
- permit the operation of hazardous functions only in reduced risk conditions while preventing hazards from linked sequences,
- Prevent any operation of hazardous functions by voluntary or involuntary action on the machine's sensors¹.

If these four conditions cannot be fulfilled simultaneously, the control or operating mode selector must activate other protective measures designed and constructed to ensure a safe intervention zone.

In addition, the operator must be able to control operation of the parts he is working on from the adjustment point.

Questions

1. Have appropriate safety features been included in the design of the machine?

Response: All appropriate safety features have been included in the design of the machine.

2. The control or operating mode selected must override all other control or operating modes, with the exception of the emergency stop?

Response: The operating mode and controls take priority over all function, excluding required emergency stop functionality.

3. If machinery has been designed and constructed to allow its use in several control or operating modes requiring different protective measures and/or work procedures, is the machinery fitted with a mode selector which can be locked in each position. Also is each position of the selector clearly identifiable and does it correspond to a single operating or control mode?

Response: The safety functions are common to all modes of operation and do not require a mode lock for the machine to remain safe.

4. If for certain operations, the machinery must be able to operate with a guard displaced or removed and/or a protective device disabled, does the control or operating mode selector simultaneously:

- disable all other control or operating modes
- permit operation of hazardous functions only by control devices requiring sustained action

- permit the operation of hazardous functions only in reduced risk conditions while preventing hazards from linked sequences
- prevent any operation of hazardous functions by voluntary or involuntary action on the machine's sensors¹

If these four conditions cannot be fulfilled simultaneously, does the control or operating mode selector activate other protective measures designed and constructed to ensure a safe intervention zone?

In addition, is the operator able to control operation of the parts he is working on from the adjustment point?

Response: No mode of operation requires guarding to be disabled.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unintended operation of the machine.	Poorly identified controls	1	1	1	1	4	None Identified.

1.2.6 - Failure of the Power Supply

Clause Requirements

The interruption, the re-establishment after an interruption or the fluctuation in whatever manner of the power supply to the machinery must not lead to dangerous situations.

Particular attention must be given to the following points:

- the machinery must not start unexpectedly¹,
- the parameters of the machinery must not change in an uncontrolled way when such change can lead to hazardous situations²,

The machinery must not be prevented from stopping if the command has already been given,

- no moving part of the machinery or piece held by the machinery must fall or be ejected³,
- automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,
- The protective devices must remain fully effective or give a stop command⁴.

Questions

1. Is it possible for the machine to restart unexpectedly after a power failure?

Response: The machine will not restart after a power failure and must be reset.

2. Machine parameters must not change in an uncontrolled manner after a power failure.

Response: The machine parameters will remain constant after a power failure.

3. Nothing should be ejected from the machine in the event of a power failure.

Response: Nothing can fall or be ejected from the machine upon failure of the power supply.

4. Automatic or manual stopping of the moving parts, whatever they may be must be unimpeded?

Response: The stopping of all parts is unimpeded and can take place at any time by the operator.

5. Do Protective devices should remain effective in the event of a power failure?

Response: Protective devices will remain effective as they are fixed guards and do not require power to function.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unintended operation of the machine.	Poorly identified controls	1	1	1	1	4	None Identified.

1.3 Protection against Mechanical Hazards

1.3.1 – Risk of Loss of Stability

Clause Requirements

Machinery and its components and fittings must be stable enough to avoid overturning, falling or uncontrolled movements during transportation, assembly, dismantling and any other action involving the machinery.¹

If the shape of the machinery itself or its intended installation does not offer sufficient stability, appropriate means of anchorage must be incorporated and indicated in the instructions.

Questions

1. Has the machine and all associated components been designed so as to have sufficient stability during operation and transportation?

Response: The machine, used in line with the instructions provided to the operator in the user and service manual provides sufficient stability. Stability testing has been performed to verify stability in reasonably foreseeable operating conditions.

2. If the shape of the machinery itself or its intended installation does not offer sufficient stability, is an appropriate means of anchorage incorporated and indicated in the instructions?

Response: The machine is sufficiently stable, but also mobile.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unintended operation of the machine.	Poorly identified controls	1	1	1	1	4	None Identified.

1.3.2 - Risk of Break Up During Operation

Clause Requirements

The various parts of machinery and their linkages must be able to withstand the stresses to which they are subject when used. The durability of the materials used must be adequate for the nature of the working environment foreseen by the manufacturer or his authorised representative, in particular as regards the phenomena of fatigue, ageing, corrosion and abrasion. The instructions must indicate the type and frequency of inspections and maintenance required for safety reasons. They must, where appropriate, indicate the parts subject to wear and the criteria for replacement¹.

Where a risk of rupture or disintegration remains despite the measures taken, the parts concerned must be mounted, positioned and/or guarded in such a way that any fragments will be contained, preventing hazardous situations.

Both rigid and flexible pipes carrying fluids, particularly those under high pressure, must be able to withstand the foreseen internal and external stresses and must be firmly attached and/or protected to ensure that no risk is posed by a rupture².

Where the material to be processed is fed to the tool automatically, the following conditions must be fulfilled to avoid risks to persons:

- when the work piece comes into contact with the tool, the latter must have attained its normal working condition,
- When the tool starts and/or stops (intentionally or accidentally), the feed movement and the tool movement must be coordinated³.

Questions

1. Has the machine and all associated components been designed so as to have sufficient stability during operation and transportation?

Response: The machine and its associated components has been designed to have sufficient stability, and for its components and fittings to be securely held in place and stable during the lifetime of the machine.

2. If the shape of the machinery itself or its intended installation does not offer sufficient stability, is an appropriate means of anchorage incorporated and indicated in the instructions?

Response: The shape of the machine a sufficient degree of stability over the machines foreseeable lifetime.

3. Where a risk of rupture or disintegration remains despite the measures taken, are the parts concerned mounted, positioned and/or guarded in such a way that any fragments will be contained, preventing hazardous situations?

Response: There is no identified residual risk of disintegration or rupture.

4. The machine does not feature any pipe work relevant to the clause.

Response: Both rigid and flexible pipes carrying fluids, particularly those under high pressure, are capable of withstanding the foreseen internal and external stresses and are firmly attached and/or protected to ensure that no risk is posed by a rupture

5. For automatic tool fed, the machine must be designed appropriately so as to avoid hazardous situations.

Response: The machine is not a tool fed machine.							
Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Failure of a component under normal operating conditions	Poor or substandard materials used	1	1	1	1	4	None Identified.
Component unable to withstand foreseeable stress or strain	Materials used not compliant with required standards						
Failure of unguarded moving components	Materials used not compliant with required standards						

1.3.3 - Risk Due to Falling or Ejected Objects

Clause Requirements

Precautions must be taken to prevent risks from falling or ejected objects¹.

Questions

1. Have precautions been taking to ensure the machine does not present a risk from falling or ejected objects?

Response: There is no discernible risk of material falling or being ejected from the machine due to the dimension and size of the bucket. Material incorrectly loaded may cause a risk but this has been addressed in the sure and service manual.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Material or debris being ejected from an unguarded section of the machine	Unguarded openings near moving components	1	1	1	1	4	None Identified.
Objects falling from an elevation.	Unguarded elevated surfaces						

1.3.4 - Risk Due to Surfaces, Edges or Angles

Clause Requirements

The machine must be designed so as to limit the risks due to rough surfaces, sharp edges and angles.

Questions

2. Have precautions been taking to ensure the machine does not present a risk from falling or ejected objects?

Response: The machine has been finished to limit any risks from rough surfaces, sharp edges and angels, this is to be maintained as such as per the user and service instructions.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Sharp edges on exposed material	Unguarded dangerous surfaces	1	1	1	1	4	None Identified.
Sharp edges on exposed material	Poorly finished materials						

1.3.5 - Risks Related to Combined Machinery

Clause Requirements

Where the machinery is intended to carry out several different operations with manual removal of the piece between each operation (combined machinery), it must be designed and constructed in such a way as to enable each element to be used separately without the other elements constituting a risk for exposed persons¹. For this purpose, it must be possible to start and stop separately any elements that are not protected².

Questions

1. Has each element of the machine been designed to be operated separately without the other elements posing a risk?

Response: The machine is not designed to be used as combined machinery.

2. Can each different element be started and stopped separately?

Response: The machine is not designed to be used as combined machinery.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Injuries to operators from other machine elements not under their control.	Danger from other elements of the machine not in use	1	1	1	1	4	None Identified.

1.3.6 - Risks Related to Variations in Operating Conditions

Clause Requirements

Where the machinery performs operations under different conditions of use, it must be designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably.

Questions

1. Where the machinery performs operations under different conditions of use, has the machine been designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably?

Response: The machine performs operations under different conditions of use. The machine has been designed and constructed in such a way as to cope with all intended environments as per the user and service manual.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unsafe operation under certain conditions of use.	Guards or safety equipment being unsuitable under all conditions of use.	1	1	1	1	4	None Identified.
Dangerous transition between conditions of use.	Guards or safety equipment being unsuitable under all conditions of use.						

1.3.7 - Risks Related to Moving Parts

Clause Requirements

The moving parts of machinery must be designed and constructed in such a way as to prevent risks of contact which could lead to accidents or must, where risks persist, be fitted with guards or protective devices¹.

All necessary steps must be taken to prevent accidental blockage of moving parts involved in the work. In cases where, despite the precautions taken, a blockage is likely to occur, the necessary specific protective devices and tools must, when appropriate, be provided to enable the equipment to be safely unblocked².

The instructions and, where possible, a sign on the machinery shall identify these specific protective devices and how they are to be used⁴.

Questions

1. Where the machinery performs operations under different conditions of use, has the machine been designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably?

Response: The machine performs operations under different conditions of use. The machine has been designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably.

2. Has the machine been designed to enable blockages to be safely unblocked?

Response: Any blockages can safely be unblocked when machine is shut down.

3. Are the specific protective devices identified in the instructions and if possible on the machine?

Response: Protective devices are identified in the instructions and not required on the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Moving parts making unexpected or unintended contact.	Lack of sufficient protection fitted to moving parts	1	1	1	1	4	None Identified.

1.3.8 - Choice of Protection against Risks Related to Moving Parts

Clause Requirements

Guards or protective devices designed to protect against risks arising from moving parts must be selected on the basis of the type of risk. The following guidelines must be used to help to make the choice.

1.3.8.1 - Moving Transmission Parts

Clause Requirements

Guards designed to protect persons against the hazards generated by moving transmission parts must be:

- either fixed guards as referred to in section 1.4.2.1, or
- Interlocking movable guards as referred to in section 1.4.2.2.

Interlocking movable guards should be used where frequent access is envisaged

Questions

1. Have guards been selected appropriately based on the type of risk involved?

Response: Guards have been selected appropriately based on the type of risk involved.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unintended access to moving parts	Insufficient protection of moving parts	1	1	1	1	4	None Identified.
Entanglement in moving parts involved in the process	Incorrect guard or shield not fit for purpose						
Impact of moving parts	Incorrect guard or shield not fit for purpose						

1.3.8.2 - Moving Parts Involved in the Process

Clause Requirements

Guards or protective devices designed to protect persons against the hazards generated by moving parts involved in the process must be:

- either fixed guards as referred to in section 1.4.2.1, or
- interlocking movable guards as referred to in section 1.4.2.2, or
- protective devices as referred to in section 1.4.3, or
- a combination of the above.

However, when certain moving parts directly involved in the process cannot be made completely inaccessible during operation owing to operations requiring operator intervention, such parts must be fitted with:

- fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and
- Adjustable guards as referred to in section 1.4.2.3 restricting access to those sections of the moving parts where access is necessary¹.

Questions

1. If there is moving parts involved in the process have the appropriate guards or protective devices been used?

Response: All moving parts involved in the process have had the appropriate guarding installed.

2. If certain moving parts directly involved in the process cannot be made completely inaccessible during operation owing to operations requiring operator intervention are such parts fitted with the appropriate guards?

Response: Moving parts are involved in the process cannot be made completely inaccessible but do not present a risk to the operator and the operator has clear line of sight when actuating moving parts.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unintended access to moving parts	Insufficient protection of moving parts	1	1	1	1	4	None Identified.
Entanglement in moving parts involved in the process	Incorrect guard or shield not fit for purpose						
Impact of moving parts	Incorrect guard or shield not fit for purpose						

1.3.9 - Risks of Uncontrolled Movements

Clause Requirements

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 hazard³.

Questions

1. When the machine is stopped, are any parts of the machine capable of drifting away from the stopped position, for any reason other than an input for a control device?

Response: The machine performs a controlled safe stop when stopped by the normal stop function. A rapid stop is activated through the use of the E-Stop.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Harm to operator or others	Lack of locking or stopping mechanism	1	1	1	1	4	None Identified.
Damage caused to surroundings	Failure of stopping mechanism						

1.4 – Required Characteristics of Guards and Protective Devices

1.4.1 - General Requirements

Clause Requirements

Guards and protective devices must:

- be of robust construction¹,
- be securely held in place,
- not give rise to any additional hazard,
- not be easy to by-pass or render non-operational,
- be located at an adequate distance from the danger zone²,
- cause minimum obstruction to the view of the production process, and
- Enable essential work to be carried out on the installation and/or replacement of tools and for maintenance purposes by restricting access exclusively to the area where the work has to be done, if possible without the guard having to be removed or the protective device having to be disabled.

In addition, guards must, where possible, protect against the ejection or falling of materials or objects and against emissions generated by the machinery.

Questions

1. Have the guards been appropriately designed using materials sufficient for the intended use?

Response: All guarding associated with the machine has been appropriately designed using materials sufficient for the intended use.

2. Do the guards protect the user sufficiently?

Response: The guarding protects the user sufficiently.

3. Are the guards securely held in place?

Response: The guarding installed on the machine is securely held in place through the use of mechanical fixings.

4. Do the guards give rise to any additional hazard?

Response: The guarding installed on the machine does not give rise to additional hazards

5. The guard must not be easy to by-pass or render non-operational.

Response: The guarding is not easy to by-pass or render non-operational.

6. The guard must be located at an adequate distance from the danger zone.

Response: The guards are located at an adequate distance from the danger zone.

7. The guard must cause minimum obstruction to the view of the production process.

Response: The guarding causes minimum obstruction to the view of the production process.

8. The guard must enable essential work to be carried out on the installation and/or replacement of tools and for maintenance purposes by restricting access exclusively to the area where the work has to be done, if possible without the guard having to be removed or the protective device having to be disabled.

Response: The guard does not hinder essential maintenance of the machine. It can be hinged in to a safe position and return to a protective position easily after the maintenance operation has been completed.

9. In addition, do the guards, where possible, protect against the ejection or falling of materials or objects and against emissions generated by the machinery?

Response: As previously identified there is no identifiable risk of ejected or falling material.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Failure of guarding	Substandard materials used	1	1	1	1	4	None identified.
Break away of guarding	Poorly fastened or secured guarding						
Dangerous placement of guarding causing obstruction	Poorly fastened or secured guarding						

1.4.2 - Special Requirements for Guards

1.4.2.1 - Fixed Guards

Clause Requirements

Fixed guards must be fixed by systems that can be opened or removed only with tools. Their fixing systems must remain attached to the guards or to the machinery when the guards are removed. Where possible, guards must be incapable of remaining in place without their fixings.

Questions

1. Have the fixed guards been designed correctly with the appropriate safety features?

Response: Fixed guards have been designed correctly with the appropriate safety features included.

2. Is the fixed guarding capable of being removed with the use of tools?

Response: The fixed guarding is only capable of being removed with the use of tools.

3. Are the guards securely held in place?

Response: The guarding installed on the machine is securely held in place through the use of mechanical fixings.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Potential unintentional access to dangerous components	Lack of sensors or warning to detect guard position or movable guards.	1	1	1	1	4	None Identified.
Guards disengaging before moving components have come to a halt	Lack of sensors or warning to detect guard position or movable guards						
Machine action without guards in place	Lack of sensors or warning to detect guard position or movable guards						

1.4.2.2 - Interlocking Movable Guards

Clause Requirements

Interlocking movable guards must:

- A. as far as possible remain attached to the machinery when open,
- B. Be designed and constructed in such a way that they can be adjusted only by means of an intentional action.

Interlocking movable guards must be associated with an interlocking device that:

- prevents the start of hazardous machinery functions until they are closed and
- Gives a stop command whenever they are no longer closed.

Where it is possible for an operator to reach the danger zone before the risk due to the hazardous machinery functions has ceased, movable guards must be associated with a guard locking device in addition to an interlocking device that:

- C. prevents the start of hazardous machinery functions until the guard is closed and locked, and
- D. Keeps the guard closed and locked until the risk of injury from the hazardous machinery functions has ceased.

Interlocking movable guards must be designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous machinery functions.

Questions

1. Have the fixed guards been designed correctly with the appropriate safety features outlined in A)- B) been achieved?

Response: The machine does not feature an interlocked guard.

2. Will the interlocking movable guard prevent machine start up if the interlocking guard is not the closed position?

Response: The machine does not feature an interlocked guard.

3. Will the activation of the interlocking movable guard force a stop command?

Response: The machine does not feature an interlocked guard.

4. Where it is possible for an operator to reach the danger zone before the risk due to the hazardous machinery functions has ceased, are all movable guards associated with a guard locking device in addition to an interlocking device that that meet the requirements outlined in C) & D)

Response: The machine does not feature an interlocked guard.

5. Are interlocking movable guards designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous machinery functions?

Response: The machine does not feature an interlocked guard.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Potential unintentional access to	Lack of sensors or warning to detect	1	1	1	1	4	None Identified.

dangerous components	guard position or movable guards.						
Guards disengaging before moving components have come to a halt	Lack of sensors or warning to detect guard position or movable guards						
Machine action without guards in place	Lack of sensors or warning to detect guard position or movable guards						

1.4.2.3 - Adjustable Guards Restricting Access

Clause Requirements

Adjustable guards restricting access to those areas of the moving parts strictly necessary for the work must be:

- A. adjustable manually or automatically, depending on the type of work involved, and
- B. Readily adjustable without the use of tools¹.

Questions

1. Have the adjustable guards been designed correctly with the appropriate safety features outlined in A)-B) been achieved?

Response: The machine does not feature an adjustable guard.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Potential unintentional access to dangerous components	Lack of sensors or warning to detect guard position or movable guards.	1	1	1	1	4	None Identified.
Guards disengaging before moving components have come to a halt	Lack of sensors or warning to detect guard position or movable guards						
Machine action without guards in place	Lack of sensors or warning to detect guard position or movable guards						

1.5 – Risks Due to Other Hazards

1.5.1 – Electricity Supply

Clause Requirements

Where machinery has an electricity supply, it must be designed, constructed and equipped in such a way that all hazards of an electrical nature are or can be prevented¹.

The safety objectives set out in Directive 2006/95/EC (Previously Directive 73/22/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.

Questions

1. Where machinery has an electricity supply, has the machine and associated electrical circuit been designed, constructed and equipped with the applicable safety devices to ensure that all hazards of an electrical nature are or can be prevented?

Response: The machine is powered from a 24v DC source, exempt from the low voltage directive.

2. Have the safety objectives set out in Directive 2006/95/EC been met in a satisfactory manner?

Response: The machine is exempt from the requirements of Directive 2006/65/EC.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Burns, Shock, etc. from electrical supply to machine.	Electrical Shock	1	1	1	1	4	None Identified.

1.5.2 - Static Electricity

Clause Requirements

Machinery must be designed and constructed to prevent or limit the build-up of potentially dangerous electrostatic charges and/or be fitted with a discharging system¹.

Questions

1. Has the machinery been designed and constructed to prevent or limit the build-up of potentially dangerous electrostatic charges and / or been fitted with a discharge system?

Response: The machine has been designed, constructed and has had the appropriate equipment installed to prevent all hazards of an electrical nature.

2. Have all exposed conductive parts of the machine been bonded?

Response: The exposed elements of the machine are bonded.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Burns, Shock, etc. from electrical supply to machine.	Electrical Shock	1	1	1	1	4	None identified.

1.5.3 - Energy Supply other than Electricity

Clause Requirements

Where machinery is powered by source of energy other than electricity, it must be so designed, constructed and equipped as to avoid all potential risks associated with such sources of energy¹.

Questions

1. Is the machinery powered by a source other than electricity?

Response: The machine also contains a hydraulic power pack.

2. Where machinery is powered by source of energy other than electricity, has it been designed, constructed and equipped correctly as to avoid all potential risks associated with such sources of energy?

Response: The pack is certified and CE mark.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Shock from built up electrical charge	Use of inappropriate materials that generate general static	1	1	1	1	4	Additional signage is required to inform the operator of all potentially hazardous sources of energy associated with the machine.

1.5.4 – Errors of Fitting

Clause Requirements

Errors likely to be made when fitting or refitting certain parts which could be a source of risk must be made impossible by the design and construction of such parts or, failing this, by information given on the parts themselves and/or their housings. The same information must be given on moving parts and/or their housings where the direction of movement needs to be known in order to avoid a risk.

Where necessary, the instructions must give further information on these risks.

Where a faulty connection can be the source of risk, incorrect connections must be made impossible by design or, failing this, by information given on the elements to be connected and, where appropriate, on the means of connection.

Questions

1. Has the relevant components been designed in such a way that errors in refitting are made impossible?

Response: No element of the machine needs to be commonly removed or fitted for its intended purpose to be served.

2. Have instructions been included with the machine detailing the proper operation of fitting?

Response: No element of the machine needs to be commonly removed or fitted for its intended purpose to be served.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Parts coming lose during operation	Difficulty refitting parts due to difficult procedure or dangerous procedure.	1	1	1	1	4	None Identified.
Operator hurt or injured during refitting procedure	Insufficient instruction or labelling on how to refit part						
Parts refitted incorrectly	Insufficient instruction or labelling on how to refit part						

1.5.5 – Extreme Temperatures

Clause Requirements

Steps must be taken to eliminate any risk of injury arising from contact with or proximity to machinery parts or materials at high or very low temperatures.

The necessary steps must also be taken to avoid or protect against the risk of hot or very cold material being ejected.

Questions

1. Have steps been taken to eliminate any risk of injury arising from contact with or proximity to machinery parts or materials at high or very low temperatures?

Response: The necessary steps have been taken to eliminate any risk of injury arising from contact with or proximity to machinery parts or materials at high or very low temperature.

2. Have the necessary steps been taken to avoid or protect against the risk of hot or very cold material being ejected, coming into contact with the operator or, where applicable, and guarding has been installed, is the guarding sufficient to protected the operator from the foreseeable hazardous situations?

Response: The machine does not contain and hazardous hot or cold surfaces of substances.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Parts coming lose during operation	Difficulty refitting parts due to difficult procedure or dangerous procedure.	1	1	1	1	4	None Identified.
Operator hurt or injured during refitting procedure	Insufficient instruction or labelling on how to refit part						
Parts refitted incorrectly	Insufficient instruction or labelling on how to refit part						

1.5.6 – Fire

Clause Requirements

Machinery must be designed and constructed in such a way as to avoid any risk of fire or overheating posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machinery¹.

Questions

1. Has the machine been designed and constructed to avoid any discernible risk of fire or overheating posed by the machine itself, gases, liquids, dust, vapours or any other substances produced or used by the machinery?

Response: There is no discernible risk of fire with the machine.

2. If the machine employs the use of gases, liquids, dust, vapours or other substances produced, have the appropriate safety features been included in the design of the machine?

Response: The machine does not contain any gases, liquids, dust, vapours or other substances.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Exposure to fire, if involved in process	Unguarded exhaust	1	1	1	1	4	None Identified.
Burns to the operator	Unguarded high temperature surface						
Inhalation burns	Lack of label or signage to indicate high temperature liquid gas or vapour.						
Fire due to exhaust fumes	Unguarded exhaust						

1.5.7 – Explosion

Clause Requirements

Machinery must be designed and constructed in such a way as to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machinery.

Machinery must comply, as far as the risk of explosion due to its use in a potentially explosive atmosphere is concerned, with the provisions of the specific Community Directives.

Questions

1. Has the machinery must been designed and constructed in such a way as to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machine?

Response: There is no discernible risk of fire with the machine.

2. Does the machinery comply, as far as the risk of explosion due to its use in a potentially explosive atmosphere is concerned, with the provisions of the specific Community Directives?

Response: The machinery complies, as far as the risk of explosion due to its use in a potentially explosive atmosphere is concerned, with the provisions of the specific Community Directives

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Explosion due to the production of an unstable gas, liquid, dust or vapour during the operation of the machine or the process.	Incorrect venting of process gases, liquids, vapours or exhaust fumes	1	1	1	1	4	None Identified.
Explosion due to the production of an unstable gas, liquid, dust or vapour during the operation of the machine or the process.	Improper storage of waste from machine or involved process.						

1.5.8 – Noise

Clause Requirements

Machinery must be designed and constructed in such a way that risks resulting from the emission of airborne noise are reduced to the lowest level, taking account of technical progress and the availability of means of reducing noise, in particular at source¹.

The level of noise emission may be assessed with reference to comparative emission data for similar machinery².

Questions

1. Has the machine been designed and constructed in such a way that risks resulting from the emission of airborne noise are reduced to the lowest level, taking account of technical progress and the availability of means of reducing noise, in particular at source?

Response: The machine does not produce excessive noise levels and has been rated by the manufacturer, this information is available in the product data sheet.

2. Has the level of noise emission been assessed with reference to comparative emission data for similar machinery?

Response: The machine does not produce excessive noise levels and has been rated by the manufacturer, this information is available in the product data sheet.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Exposure to fire, if involved in process	Unguarded exhaust	1	1	1	1	4	None Identified.
Burns to the operator	Unguarded high temperature surface						

1.5.9 – Vibration

Clause Requirements

Machinery must be designed and constructed in such a way that risks resulting from vibrations produced by the machinery are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source^{1&2}.

The level of vibration emission may be assessed with reference to comparative emission data for similar machinery.

Questions

1. Has the machine been designed and constructed in such a way that risks resulting from vibrations produced by the machinery are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source?

Response: The machine does not vibrate in a dangerous or potentially hazardous way. The machines design offers sufficient stability.

2. Has the level of noise emission been assessed with reference to comparative emission data for similar machinery?

Response: The level of vibration emission has assessed with reference to comparative emission data for similar machinery.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Vibration damage to the operator or surrounding environment	Insufficient vibration dampening between the machine and vibrating components	1	1	1	1	4	None Identified.
Vibration damage to the operator or surrounding environment	Lack of vibration dampening between the machine and the operators position						
Vibration damage to the operator or surrounding environment	Insufficient vibration dissipation						

1.5.10 – Radiation

Clause Requirements

Undesirable radiation emissions from the machinery must be eliminated or be reduced to levels that do not have adverse effects on persons¹.

Any functional ionising radiation emissions must be limited to the lowest level which is sufficient for the proper functioning of the machinery during setting, operation and cleaning. Where a risk exists, the necessary protective measures must be taken.

Any functional non-ionising radiation emissions during setting, operation and cleaning must be limited to levels that do not have adverse effects on persons.

Questions

1. Has any and all undesirable radiation emissions from the machinery been eliminated or be reduced to levels that do not have adverse effects on the environment or operators?

Response: There is no discernible risk of radiation from the machine.

2. Where any functional ionising radiation emissions exist, have the necessary precautions been taking to limit the lowest level which is sufficient for the proper functioning of the machinery during setting, operation and cleaning. Where a risk exists, the necessary protective measures must be taken?

Response: No functional ionising radiation is emitted from the machine.

3. If applicable, has any functional non-ionising radiation emissions during setting, operation and cleaning must be limited to levels that do not have adverse effects on persons?

Response: No functional ionising radiation is emitted from the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Vibration damage to the operator or surrounding environment	Insufficient vibration dampening between the machine and vibrating components	1	1	1	1	4	None Identified.
Vibration damage to the operator or surrounding environment	Lack of vibration dampening between the machine and the operators position						
Vibration damage to the operator or surrounding environment	Insufficient vibration dissipation						

1.5.12 – Laser Equipment

Clause Requirements

Where laser equipment is used, the following should be taken into account:

- laser equipment on machinery must be designed and constructed in such a way as to prevent any accidental radiation,
- laser equipment on machinery must be protected in such a way that effective radiation, radiation produced by reflection or diffusion and secondary radiation do not damage health,
- Optical equipment for the observation or adjustment of laser equipment on machinery must be such that no health risk is created by laser radiation¹.

Questions

1. Is laser equipment employed by the machine?

Response: Laser equipment is not employed by the machine.

2. If applicable, has all associated laser equipment on machinery been designed and constructed in such a way as to prevent any accidental radiation?

Response: Not applicable.

3. If applicable, has the laser equipment associated with the machinery been protected in such a way that effective radiation, radiation produced by reflection or diffusion and secondary radiation do not damage health of the operator and operating environment?

Response: Not applicable.

4. If applicable, is the optical equipment for the observation or adjustment of laser equipment on machinery, such that no health risk is created by laser radiation?

Response: Not applicable.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Exposure to laser equipment	Lack of sufficient guard to protect from accidental exposure.	1	1	1	1	4	None Identified.
Exposure to radiation	Optical equipment not to correct standard to prevent damage to operator						

1.5.13 – Emissions of Hazardous Materials and Substances

Clause Requirements

Machinery must be designed and constructed in such a way that risks of inhalation, ingestion, contact with the skin, eyes and mucous membranes and penetration through the skin of hazardous materials and substances which it produces can be avoided¹.

Where a hazard cannot be eliminated, the machinery must be so equipped that hazardous materials and substances can be contained, evacuated, precipitated by water spraying, filtered or treated by another equally effective method.

Where the process is not totally enclosed during normal operation of the machinery, the devices for containment and/or evacuation must be situated in such a way as to have the maximum effect²

Questions

1. Is the machinery designed and constructed in such a way that risks of inhalation, ingestion, contact with the skin, eyes and mucous membranes and penetration through the skin of hazardous materials and substances which it produces can be avoided?

Response: The machine has been designed and constructed in such a way that all risks of inhalation, contact with the skin, eyes and mucous membranes and penetration through the skin of hazardous materials and substances which it produces are avoided through the use of machine guarding where applicable, outside of the materials being handled by the machine. The reasonably foreseeable materials and intended contents that will be handled by the machine should present no additional risk.

2. Where a hazard cannot be eliminated, has the machinery been equipped so that hazardous materials and substances can be contained, evacuated, precipitated by water spraying, filtered or treated by another equally effective method.

Response: Not applicable.

3. Where the process is not totally enclosed during normal operation of the machinery, have devices for containment and/or evacuation been situated in such a way as to have the maximum effect and offer the operator and environment the greatest degree of protection possible?

Response: Not applicable.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Inhalation of dangerous gasses	Exhaust points too close to standard operating position	1	1	1	1	4	None Identified.
Steams or spray of dangerous chemicals	Exposed chemical discharge points that could potentially affect the operator						
Exposed chemicals in proximity to operator	Lack of control to evacuate						

	chemicals when needed.						
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1.5.14 – Risk of Being Trapped in a Machine

Clause Requirements

Machinery must be designed, constructed or fitted with a means of preventing a person from being enclosed within it or, if that is impossible, with a means of summoning help.

Questions

1. Is the machinery designed and constructed or fitted with a means of preventing a person from being enclosed within it or, if that is impossible, with a means of summoning help?

Response The design of the machine and operators position is such that it does not require the operator to enter the machine.

2. If it is impossible to prevent a person from being enclosed within the machine is there a means of summoning help?

Response: The design of the machine and operators position is such that it does not require the operator to enter the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Becoming trapped	Inability to access controls or release mechanism	1	1	1	1	4	None Identified.
Being unable to summon help	Inability to access controls or release mechanism						

1.5.15 – Risk of Slipping, Tripping or Falling

Clause Requirements

Parts of the machinery where persons are liable to move about or stand must be designed and constructed in such a way as to prevent persons slipping, tripping or falling on or off these parts¹. Where appropriate, these parts must be fitted with handholds that are fixed relative to the user and that enable them to maintain their stability²

Questions

1. Is the machine designed to be walked on any part of it?

Response The machine features a platform for standing.

2. Where parts of the machinery are liable to allow for movement or the operator to stand, have the appropriate parts been fitted with handholds and footholds to enable them to maintain their stability and reduce the risk?

Response: The design of the machine is such as to accommodate the operator to stand at the rear of the machine. The platform is an anti-slip surface, features raise able guards to stabilise the operator and help protect him and the controls for the machine have integrated hand grips.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Slipping on a platform or walkway.	Incorrect surface used as platform	1	1	1	1	4	None Identified.
Tripping on a platform or walkway	Surface incorrect to deal with environmental conditions						
Falling from a platform or walkway`	Lack or supports, railings or handrails.						

1.5.16 – Lighting

Clause Requirements

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 earth¹.

Questions

1. Is the machine designed to be use outdoors or as part of sub-assembly connected to the outdoors conductive parts?

Response The machine is mobile and not intended to be fixed outdoors or erected in successive locations, this cause is not applicable.

2. Where parts of the machinery can be subject to the risk of lightning, has the appropriate lightning conductor and the means of connecting the conductor to earth system been appropriately fitted?

Response: Not applicable.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Electrocution of the operator or the occupant	Lightning Strike	1	1	1	1	4	None Identified.

1.6 Maintenance

1.6.1 Machinery Maintenance

Clause Requirements

Adjustment and maintenance points must be located outside danger zones. It must be possible to carry out adjustment, maintenance, repair, cleaning and servicing operations while machinery is at a standstill^{1&2}.

If one or more of the above conditions cannot be satisfied for technical reasons, measures must be taken to ensure that these operations can be carried out safely (see section 1.2.5).

In the case of automated machinery and, where necessary, other machinery, a connecting device for mounting diagnostic fault-finding equipment must be provided. Automated machinery components which have to be changed frequently must be capable of being removed and replaced easily and safely. Access to the components must enable these tasks to be carried out with the necessary technical means in accordance with a specified operating method.

Questions

1. Have the adjustment and maintenance points been located in suitable positions to carry out the relevant operations?

Response Maintenance can be carried out easily and safely.

2. The machine should be at a standstill during maintenance operations etc.?

Response: Machine must be completely stationary before/during service and repair.

3. Is there a connecting device for mounting diagnostic fault-finding equipment provided in the case of automated machinery and, where necessary, other machinery?

Response: Diagnostic fault finding is conducted by the original manufacturer.

4. Are automated machinery components which have to be changed frequently capable of being removed and replaced easily and safely? Access to the components must enable these tasks to be carried out with the necessary technical means in accordance with a specified operating method.

Response: Maintenance can be carried out easily and safely.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Maintenance being carried out near dangerous components.	Lack of safe access to maintenance points	1	1	1	1	4	None Identified.
Danger to maintenance personnel of working with active machinery	Inability to service the machinery at a standstill.						

1.6.2 Access to Operating Positions & Servicing Points

Clause Requirements

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 machinery¹.

Questions

1. Has the machinery been designed and constructed in such as to allow access safely to all areas where intervention is necessary during operation, adjustment and maintenance of the machine?

Response Maintenance can be carried out easily and safely. Access to relevant areas has been designed safely.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unsafe access to obscured components.	Poor design with regards to the operation and maintenance.	1	1	1	1	4	None Identified.
Inability to work with/repair components	Poor design with regards to the operation and maintenance.						

1.6.3 – Isolation of Energy Sources

Clause Requirements

Machinery must be fitted with means to isolate it from all energy sources¹. Such isolators must be clearly identified². They must be capable of being locked if reconnection could endanger persons. Isolators must also be capable of being locked where an operator is unable, from any of the points to which he has access, to check that the energy is still cut off.

In the case of machinery capable of being plugged into an electricity supply, removal of the plug is sufficient, provided that the operator can check from any of the points to which he has access that the plug remains removed³. After the energy is cut off, it must be possible to dissipate normally any energy remaining or stored in the circuits of the machinery without risk to persons.

As an exception to the requirement laid down in the previous paragraphs, certain circuits may remain connected to their energy sources in order, for example, to hold parts, to protect information, to light interiors, etc. In this case, special steps must be taken to ensure operator safety.

Questions

1. Has the machine been fitted with a means of isolating all associated energy sources?

Response: The machine can be fully isolated from all energy sources.

2. Have all associated isolating devices been clearly identified?

Response: The method of isolation has been identified in the user and service manual.

3. The isolators must be capable of being locked if reconnection could endanger persons?

Response: Isolation, the key can be removed and held by the service person performing maintenance.

4. Can the operator check from all points of the machine that the energy sources remain isolated?

Response: Isolation, the key can be removed and held by the service person performing maintenance.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Shock or electrocution from energy source	Inability to isolate energy source	1	1	1	1	4	
Shock or electrocution from energy source	Poorly identified energy source						
Shock or electrocution from energy source	Inability to check the status of the energy source.						

1.6.4 – Operator Intervention

Clause Requirements

Machinery must be so designed, constructed and equipped that the need for operator intervention is limited¹. If operator intervention cannot be avoided, it must be possible to carry it out easily and safely.

Questions

1. Has the machinery been designed, constructed and equipped so that the need for operator intervention is limited?

Response: The need for operator intervention is limited by the design of the machine.

2. If operator intervention cannot be avoided, is this action possible to carry it out easily and safely?

Response: The machine must be completely isolated from all energy sources before operator intervention or maintenance works.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Shock or electrocution from energy source	Inability to isolate energy source	1	1	1	1	4	None Identified.
Shock or electrocution from energy source	Poorly identified energy source						
Shock or electrocution from energy source	Inability to check the status of the energy source.						

1.6.5 – Cleaning of Internal Parts

Clause Requirements

The machinery must be designed and constructed in such a way that it is possible to clean internal parts which have contained dangerous substances or preparations without entering them, any necessary unblocking must also be possible from the outside¹.

If it is impossible to avoid entering the machinery, it must be designed and constructed in such a way as to allow cleaning to take place safely.

Questions

1. The design of the machine must be such that the operator does not have to enter the machine in order to clean it. The design of the machine must be such that the operator does not have to enter the machine in order to clean it?

Response: The design of the machine is such that the operator does not have to enter the machine in order to clean it.

2. Any necessary unblocking must also be possible from the outside?

Response: Any necessary unblocking is possible from the outside.

3. If it is impossible to avoid entering the machinery, is the machinery designed and constructed in such a way as to allow cleaning to take place safely

Response: The machine doesn't have to be entered to be cleaned.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Having to enter the machine to unblock or repair	Lack of easy access to internal parts	1	1	1	1	4	None Identified.
Inability to clear/clean dangerous substance in a safe manner	Lack of easy access to internal parts						

1.7 Information

1.7.1 – Information and Warnings on the Machinery

Clause Requirements

Information and warnings on the machinery should preferably be provided in the form of readily understandable symbols or pictograms. Any written or verbal information and warnings must be expressed in an official Community language or languages, which may be determined in accordance with the Treaty by the Member State in which the machinery is placed on the market and/or put into service and may be accompanied, on request, by versions in any other official Community language or languages understood by the operators.

1.7.1.1 – Information and Information Devices

Clause Requirements

The information needed to control machinery must be provided in a form that is unambiguous and easily understood. It must not be excessive to the extent of overloading the operator¹. Visual display units or any other interactive means of communication between the operator and the machine must be easily understood and easy to use.

Questions

1. Relevant information and warnings must be easy to interpret and understand.

Response: All relevant information and warning devices are easily interpreted and understood.

2. Relevant instructions should be included in the user & service manual.

Response: The relevant information has been included in the user and service manual.

3. Are all associated visual display units or any other interactive means of communication between the operator and the machine easily understood and easy to use?

Response: All associated visual display units or any other interactive means of communication between the operator and the machine are easily understood and easy to use.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unawareness of potential hazard or danger.	Lack of warning signage.	1	1	1	1	4	None Identified.
Unawareness of potential hazard or danger.	Poorly designed signage.						
Unawareness of potential hazard or danger.	Badly placed or positioned warning signage						

1.7.1.2 – Warning Devices

Clause Requirements

Where the health and safety of persons may be endangered by a fault in the operation of unsupervised machinery, the machinery must be equipped in such a way as to give an appropriate acoustic or light signal as a warning.

Where machinery is equipped with warning devices these must be unambiguous and easily perceived. The operator must have facilities to check the operation of such warning devices at all times. The requirements of the specific Community Directives concerning colours and safety signals must be complied with².

Questions

1. Where the health and safety of persons may be endangered by a fault in the operation of unsupervised machinery, is the machinery equipped in such a way as to give an appropriate acoustic or light signal as a warning?

Response: Where the health and safety of persons may be endangered by a fault in the operation of unsupervised machinery, the machinery has been equipped with a device, which gives an appropriate acoustic or light signal as a warning. All faults and alarms are flagged on the machines HMI panel.

2. Where machinery is equipped with warning devices are these unambiguous and easily perceived?

Response: The location of the beacon currently prevent it from being seen easily from the front of the machine with the bucket in the down position.

3. Has the operator the facilities to check the operation of such warning devices at all times?

Response: The operator has the facilities to check the operation of such a warning device.

4. Where applicable, are the requirements of the specific Community Directives concerning colours and safety signals must be complied with?

Response: The specific community directives concerning colours and safety signals have been complied with.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Unawareness of potential hazard or danger.	Lack of warning signage.						
Unawareness of potential hazard or danger.	Poorly designed signage.	3	1	2	2	8	Repositioning of the beacon light is required.
Unawareness of potential hazard or danger.	Badly placed or positioned warning signage						

1.7.2 Warning of Residual Risks

Clause Requirements

Where risks remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, must be provided¹

Questions

1. Where risks remain despite the inherent safe design measures, have all associated safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, been provided?

Response: Where risks remain despite the inherent safe design measures, all associated safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, have been provided and protect the operator sufficiently.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Danger to the operator or occupant.	Lack of sufficient warning labels and devices	1	1	1	1	4	None Identified.

1.7.3 – Marking of Machinery

Clause Requirements

All machinery must be marked visibly, legibly and indelibly with the following minimum particulars:

- the business name and full address of the manufacturer and, where applicable, his authorised representative,
- designation of the machinery,
- the CE Marking (see Annex III),
- designation of series or type,
- serial number, if any,
- The year of construction, that is the year in which the manufacturing process is completed.

It is prohibited to pre-date or post-date the machinery when affixing the CE marking.

Furthermore, machinery designed and constructed for use in a potentially explosive atmosphere must be marked accordingly.

Machinery must also bear full information relevant to its type and essential for safe use. Such information is subject to the requirements set out in section 1.7.1.

Where a machine part must be handled during use with lifting equipment, its mass must be indicated legibly, indelibly and unambiguously¹.

Questions

1. Have the relevant essential markings been placed on the machine?

Response: The relevant marking are on the machine and have been provided in the user and service manual with the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Incorrect use of machinery.	Lack of appropriate markings.	1	1	1	1	4	None identified.
Use of incorrect machinery for task at hand.	Lack of appropriate markings						

1.7.3 – Marking of Machinery

Clause Requirements

All machinery must be marked visibly, legibly and indelibly with the following minimum particulars:

- the business name and full address of the manufacturer and, where applicable, his authorised representative,
- designation of the machinery,
- the CE Marking (see Annex III),
- designation of series or type,
- serial number, if any,
- The year of construction, that is the year in which the manufacturing process is completed.

It is prohibited to pre-date or post-date the machinery when affixing the CE marking.

Furthermore, machinery designed and constructed for use in a potentially explosive atmosphere must be marked accordingly.

Machinery must also bear full information relevant to its type and essential for safe use. Such information is subject to the requirements set out in section 1.7.1.

Where a machine part must be handled during use with lifting equipment, its mass must be indicated legibly, indelibly and unambiguously¹.

Questions

1. Have the relevant essential markings outlined from (a – c) above been placed on the machine?

Response: The relevant markings outlined above will be placed on the machine based on the finding of this assessment.

2. Has the machinery designed and constructed for use in a potentially explosive atmosphere and has the machine been marked accordingly?

Response: The machine is not designed to be used in an explosive atmosphere.

3. Does the machinery bear full information relevant to its type and essential for safe use?

Response: The machinery bears the full information relevant to its type and essential for safe use.

4. Where a machine part must be handled during use with lifting equipment, has its mass been indicated legibly, indelibly and unambiguously?

Response: Not applicable.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Incorrect use of machinery.	Lack of appropriate markings.	1	1	1	1	4	None Identified.
Use of incorrect machinery for task at hand.	Lack of appropriate markings						

1.7.4 – Instructions

Clause Requirements

All machinery must be accompanied by instructions in the official Community language or languages of the Member State in which it is placed on the market and/or put into service.

The instructions accompanying the machinery must be either 'Original instructions' or a 'Translation of the original instructions', in which case the translation must be accompanied by the original instructions.

By way of exception, the maintenance instructions intended for use by specialised personnel mandated by the manufacturer or his authorised representative may be supplied in only one Community language which the specialised personnel understand.

The instructions must be drafted in accordance with the principles set out below.

1.7.4.1 - General Principles for the Drafting of Instructions

Clause Requirements

(a) The instructions must be drafted in one or more official Community languages. The words 'Original instructions' must appear on the language version(s) verified by the manufacturer or his authorised representative.

(b) Where no 'Original instructions' exist in the official language(s) of the country where the machinery is to be used, a translation into that/those language(s) must be provided by the manufacturer or his authorised representative or by the person bringing the machinery into the language area in question. The translations must bear the words 'Translation of the original instructions'.

(c) The contents of the instructions must cover not only the intended use of the machinery but also take into account any reasonably foreseeable misuse thereof.

(d) 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.

Questions

1. Has a user & service manual, a standard operating procedure or detailed instructions been produced for the machine with all the relevant information (a – c) above been drafted for the machine?

Response: A User & Service manual has been produced for the machine with all the relevant information included.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Dangerous operation.	Lack of instruction manual	1	1	1	1	4	None Identified.
Dangerous operation.	Unclear instruction manual lacking in information						

1.7.4.2 - Contents of the Instructions

Clause Requirements

Each instruction manual must contain, where applicable, at least the following information:

- a) the business name and full address of the manufacturer and of his authorised representative;
- b) the designation of the machinery as marked on the machinery itself, except for the serial number (see section 1.7.3);
- c) the EC declaration of conformity, or a document setting out the contents of the EC declaration of conformity, showing the particulars of the machinery, not necessarily including the serial number and the signature;
- d) a general description of the machinery;
- e) the drawings, diagrams, descriptions and explanations necessary for the use, maintenance and repair of the machinery and for checking its correct functioning;
- f) a description of the workstation(s) likely to be occupied by operators;
- g) a description of the intended use of the machinery;
- h) warnings concerning ways in which the machinery must not be used that experience has shown might occur
- i) assembly, installation and connection instructions, including drawings, diagrams and the means of attachment and the designation of the chassis or installation on which the machinery is to be mounted;
- j) instructions relating to installation and assembly for reducing noise or vibration;
- k) instructions for the putting into service and use of the machinery and, if necessary, instructions for the training of operators;
- l) information about the residual risks that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted;
- m) instructions on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided;
- n) the essential characteristics of tools which may be fitted to the machinery;
- o) the conditions in which the machinery meets the requirement of stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;
- p) instructions with a view to ensuring that transport, handling and storage operations can be made safely, giving the mass of the machinery and of its various parts where these are regularly to be transported separately;
- q) the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked;
- r) the description of the adjustment and maintenance operations that should be carried out by the user and the preventive maintenance measures that should be observed;
- s) instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;
- t) the specifications of the spare parts to be used, when these affect the health and safety of operators;
- u) the following information on airborne noise emissions;
 - the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this fact must be indicated,
 - the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa),
 - the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).

These values must be either those actually measured for the machinery in question or those established on the basis of measurements taken for technically comparable which is representative of the machinery to be produced. In the case of very large machinery, instead of the A-weighted sound power level, the A-weighted emission sound pressure levels at specified positions around the machinery may be indicated.

Where the harmonised standards are not applied, sound levels must be measured using the most appropriate method for the machinery. Whenever sound emission values are indicated the uncertainties surrounding these values must be specified.

The operating conditions of the machinery during measurement and the measuring methods used must be described.

Where the workstation(s) are undefined or cannot be defined, A-weighted sound pressure levels must be measured at a distance of 1 metre from the surface of the machinery and at a height of 1.6 metres from the floor or access platform. The position and value of the maximum sound pressure must be indicated. Where specific Community Directives lay down other requirements for the measurement of sound pressure levels or sound power levels, those Directives must be applied and the corresponding provisions of this section shall not apply;

v) Where machinery is likely to emit non-ionising radiation which may cause harm to persons, in particular persons with active or non-active implantable medical devices, information concerning the radiation emitted for the operator and exposed persons.

Questions

1. Does the instruction manual contain, where applicable, at least the information listed from ((a)-(v)) above?

Response: The instruction manual does contain, where applicable, the majority of the information listed from ((a)-(v)) above. Anything that is not included was not necessary for the purpose of the risk assessment relevant to the machine.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Dangerous operation.	Lack of instruction manual	1	1	1	1	4	None Identified.
Dangerous operation.	Unclear instruction manual lacking in information						

1.7.4.3 - Sales Literature

Clause Requirements

Sales literature describing the machinery must not contradict the instructions as regards health and safety aspects. Sales literature describing the performance characteristics of machinery must contain the same information on emissions as is contained in the instructions¹.

Questions

1. The sales literature describing the machinery must not contradict the instructions as regards health and safety aspects?

Response: The sales literature describing the machinery does not contradict the instructions as regards health and safety aspects.

2. Does the sales literature describing the performance characteristics of machinery contain the same information on emissions as is contained in the instructions?

Response: Machine does not produce emissions.

Potential Hazard	Origin of Hazard	Risk Estimation					Residual Risk
		S	L	A	O	T	
Dangerous operation.	Lack of instruction manual	1	1	1	1	4	None Identified.
Dangerous operation.	Unclear instruction manual lacking in information						

3.0 – Supplementary Essential Health and Safety Requirements to Offset Hazards Due to the Mobility of Machinery

3.2.1. Driving position

Clause Requirements

Visibility from the driving position must be such that the driver can, in complete safety for himself and the exposed persons, operate the machinery and its tools in their foreseeable conditions of use. Where necessary, appropriate devices must be provided to remedy hazards due to inadequate direct vision. Machinery on which the driver is transported must be designed and constructed in such a way that, from the driving positions, there is no risk to the driver from inadvertent contact with the wheels and tracks.

The driving position of ride-on drivers must be designed and constructed in such a way that a driver's cab may be fitted, provided this does not increase the risk and there is room for it. The cab must incorporate a place for the instructions needed for the driver.

Response:

The drivers position provides good visibility of the danger zones and allows the operator to safely drive the machine.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.2.2. Seating

Clause Requirements

Where there is a risk that operators or other persons transported by the machinery may be crushed between parts of the machinery and the ground should the machinery roll or tip over, in particular for machinery equipped with a protective structure referred to in section 3.4.3 or 3.4.4, their seats must be designed or equipped with a restraint system so as to keep the persons in their seats, without restricting movements necessary for operations or movements relative to the structure caused by the suspension of the seats. Such restraint systems should not be fitted if they increase the risk.

Response:

There is no seating provided on the machine, the operator steps off it begins to overturn.

Risk Estimation	Residual Risk
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S	L	A	O	T	
1	1	1	1	4	None Identified.

3.2.3. Positions for other persons

Clause Requirements

If the conditions of use provide that persons other than the driver may occasionally or regularly be transported by the machinery or work on it, appropriate positions must be provided which enable them to be transported or to work on it without risk.

The second and third paragraphs of section 3.2.1 also apply to the places provided for persons other than the driver.

Response:

No other person is intended to ride on any part of the machine as a passenger.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.3. CONTROL SYSTEMS

Clause Requirements

If necessary, steps must be taken to prevent unauthorised use of controls. In the case of remote controls, each control unit must clearly identify the machinery to be controlled from that unit.

The remote control system must be designed and constructed in such a way as to affect only:

- the machinery in question,
- the functions in question.

Remote controlled machinery must be designed and constructed in such a way that it will respond only to signals from the intended control units.

Response:

The key for the machine is held by the driver/operator only and is to be removed when leaving the machine.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.3.1. Control devices

Clause Requirements

The driver must be able to actuate all control devices required to operate the machinery from the driving position, except for functions which can be safely actuated only by using control devices located elsewhere. These functions include, in particular, those for which operators other than the driver are responsible or for which the driver has to leave the driving position in order to control them safely.

Where there are pedals, they must be so designed, constructed and fitted as to allow safe operation by the driver with the minimum risk of incorrect operation. They must have a slip-resistant surface and be easy to clean.

Where their operation can lead to hazards, notably dangerous movements, the control devices, except for those with preset positions, must return to the neutral position as soon as they are released by the operator.

In the case of wheeled machinery, the steering system must be designed and constructed in such a way as to reduce the force of sudden movements of the steering wheel or the steering lever caused by shocks to the guide wheels.

Any control that locks the differential must be so designed and arranged that it allows the differential to be unlocked when the machinery is moving.

The sixth paragraph of section 1.2.2, concerning acoustic and/or visual warning signals, applies only in the case of reversing.

Response:

All elements requiring actuation are easily operated by the operator. The machine does not feature pedals. Controls return to the neutral position when released by the operator. The starting system is not directly connected to the wheel controlling direction and integrates smart technology to limit the effects of rapid turns to the wheel.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.3.2. Starting/moving

Clause Requirements

All travel movements of self-propelled machinery with a ride-on driver must be possible only if the driver is at the controls.

Where, for operating purposes, machinery is fitted with devices which exceed its normal clearance zone (e.g. stabilisers, jib, etc.), the driver must be provided with the means of checking easily, before moving the machinery, that such devices are in a particular position which allows safe movement.

This also applies to all other parts which, to allow safe movement, have to be in particular positions, locked if necessary.

Where it does not give rise to other risks, movement of the machinery must depend on safe positioning of the aforementioned parts.

It must not be possible for unintentional movement of the machinery to occur while the engine is being started.

Response:

The movement of the machine is only possible with the driver at the controls. Controls return to centre when released.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.3.3. Travelling function

Clause Requirements

Without prejudice to road traffic regulations, self-propelled machinery and its trailers must meet the requirements for slowing down, stopping, braking and immobilisation so as to ensure safety under all the operating, load, speed, ground and gradient conditions allowed for.

The driver must be able to slow down and stop self-propelled machinery by means of a main device. Where safety so requires, in the event of a failure of the main device, or in the absence of the energy supply needed to actuate the main device, an emergency device with a fully independent and easily accessible control device must be provided for slowing down and stopping.

Where safety so requires, a parking device must be provided to render stationary machinery immobile. This device may be combined with one of the devices referred to in the second paragraph, provided that it is purely mechanical.

Remote-controlled machinery must be equipped with devices for stopping operation automatically and immediately and for preventing potentially dangerous operation in the following situations:

- if the driver loses control,
- if it receives a stop signal,
- if a fault is detected in a safety-related part of the system,
- if no validation signal is detected within a specified time.

Section 1.2.4 does not apply to the travelling function.

Response:

The machine has been tested to accommodate for the expected conditions of its intended environment. The speed of the machine will return to a stop if the controls of the machine are release. No remote controlled driving has been included as part of this assessment.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.3.4. Movement of pedestrian-controlled machinery

Clause Requirements

Movement of pedestrian-controlled self-propelled machinery must be possible only through sustained action on the relevant control device by the driver. In particular, it must not be possible for movement to occur while the engine is being started.

The control systems for pedestrian-controlled machinery must be designed in such a way as to minimise the risks arising from inadvertent movement of the machine towards the driver, in particular:

- crushing,
- injury from rotating tools.

The speed of travel of the machinery must be compatible with the pace of a driver on foot.

In the case of machinery on which a rotary tool may be fitted, it must not be possible to actuate the tool when the reverse control is engaged, except where the movement of the machinery results from movement of the tool. In the latter case, the reversing speed must be such that it does not endanger the driver.

Response:

The movement of the machine will cease if the controls are released when being operated by a pedestrian. The controls are located in such a way as to limit the possible accidental interaction that may occur.

The speed of travel is controlled by the operator.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.3.5. Control circuit failure

Clause Requirements

A failure in the power supply to the power-assisted steering, where fitted, must not prevent machinery from being steered during the time required to stop it.

Response:

The time frame for an emergency stop is so small that it would be quicker to hit the estop that attempt to steer the machine.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4. PROTECTION AGAINST MECHANICAL HAZARDS

3.4.1. Uncontrolled movements

Clause Requirements

Machinery must be designed, constructed and where appropriate placed on its mobile support in such a way as to ensure that, when moved, uncontrolled oscillations of its centre of gravity do not affect its stability or exert excessive strain on its structure.

Response:

Movable parts of the machine will not destabilise it when used in line with the instructions provided in the user and service instructions.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4.2. Moving transmission parts

Clause Requirements

By way of exception to section 1.3.8.1, in the case of engines, moveable guards preventing access to the moving parts in the engine compartment need not have interlocking devices if they have to be opened either by the use of a tool or key or by a control located in the driving position, providing the latter is in a fully enclosed cab with a lock to prevent unauthorised access.

Response:

The machine does not feature exposed transmission parts that may present a risk to the operator.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4.3. Roll-over and tip-over

Clause Requirements

Where, in the case of self-propelled machinery with a ride-on driver, operator(s) or other person(s), there is a risk of rolling or tipping over, the machinery must be fitted with an appropriate protective structure, unless this increases the risk.

This structure must be such that in the event of rolling or tipping over it affords the ride-on person(s) an adequate deflection-limiting volume.

In order to verify that the structure complies with the requirement laid down in the second paragraph, the manufacturer or his authorised representative must, for each type of structure concerned, perform appropriate tests or have such tests performed.

Response:

The driver is not riding on a seat on the machine and can simply step aside if the machine begins to overturn in all foreseeable conditions.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4.4. Falling objects

Clause Requirements

Where, in the case of self-propelled machinery with a ride-on driver, operator(s) or other person(s), there is a risk due to falling objects or material, the machinery must be designed and constructed in such a way as to take account of this risk and fitted, if its size allows, with an appropriate protective structure.

This structure must be such that, in the event of falling objects or material, it guarantees the ride-on person(s) an adequate deflection-limiting volume.

In order to verify that the structure complies with the requirement laid down in the second paragraph, the manufacturer or his authorised representative must, for each type of structure concerned, perform appropriate tests or have such tests performed.

Response:

The only risk to the operator falling material is during the loading of the bucket with materials by other operators. The instructions of the machine indicate that the operator is to vacate the standing position before the materials are loaded in to the bucket.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4.5. Means of access

Clause Requirements

Handholds and steps must be designed, constructed and arranged in such a way that the operators use them instinctively and do not use the control devices to assist access.

Response: Handholds on the machine are instinctively used by the operator.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4.6. Towing devices

Clause Requirements

All machinery used to tow or to be towed must be fitted with towing or coupling devices designed, constructed and arranged in such a way as to ensure easy and secure connection and disconnection and to prevent accidental disconnection during use.

Insofar as the tow bar load so requires, such machinery must be equipped with a support with a bearing surface suited to the load and the ground.

Response:

The machine is not designed to tow or be towed.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.4.7. Transmission of power between self-propelled machinery (or tractor) and recipient machinery

Clause Requirements

Removable mechanical transmission devices linking self-propelled machinery (or a tractor) to the first fixed bearing of recipient machinery must be designed and constructed in such a way that any part that moves during operation is protected over its whole length.

On the side of the self-propelled machinery (or tractor), the power take-off to which the removable mechanical transmission device is attached must be protected either by a guard fixed and linked to the self-propelled machinery (or tractor) or by any other device offering equivalent protection.

It must be possible to open this guard for access to the removable transmission device. Once it is in place, there must be enough room to prevent the drive shaft damaging the guard when the machinery (or the tractor) is moving.

On the recipient machinery side, the input shaft must be enclosed in a protective casing fixed to the machinery.

Torque limiters or freewheels may be fitted to universal joint transmissions only on the side adjoining the driven machinery. The removable mechanical transmission device must be marked accordingly. All recipient machinery, the operation of which requires a removable mechanical transmission device to connect it to self-propelled machinery (or a tractor), must have a system for attaching the removable mechanical transmission device so that, when the machinery is uncoupled, the removable mechanical transmission device and its guard are not damaged by contact with the ground or part of the machinery.

The outside parts of the guard must be so designed, constructed and arranged that they cannot turn with the removable mechanical transmission device. The guard must cover the transmission to the ends of the inner jaws in the case of simple universal joints and at least to the centre of the outer joint or joints in the case of wide-angle universal joints.

If means of access to working positions are provided near to the removable mechanical transmission device, they must be designed and constructed in such a way that the shaft guards cannot be used as steps, unless designed and constructed for that purpose.

Response:

The machine is not designed to deliver power to recipient machinery.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.5. PROTECTION AGAINST OTHER HAZARDS

3.5.1. Batteries

Clause Requirements

The battery housing must be designed and constructed in such a way as to prevent the electrolyte being ejected on to the operator in the event of rollover or tipover and to avoid the accumulation of vapours in places occupied by operators. Machinery must be designed and constructed in such a way that the battery can be disconnected with the aid of an easily accessible device provided for that purpose.

Response: The battery for the machine is fully enclosed and safe from expected external harm.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.5.2. Fire

Clause Requirements

Depending on the hazards anticipated by the manufacturer, machinery must, where its size permits:
 — either allow easily accessible fire extinguishers to be fitted, or
 — be provided with built-in extinguisher systems.

Response:

There is no expected fire hazard with the machine.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.5.3. Emissions of hazardous substances

Clause Requirements

The second and third paragraphs of section 1.5.13 do not apply where the main function of the machinery is the spraying of products. However, the operator must be protected against the risk of exposure to such hazardous emissions.

Response:

Not applicable.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.6. INFORMATION AND INDICATIONS

3.6.1. Signs, signals and warnings

Clause Requirements

All machinery must have signs and/or instruction plates concerning use, adjustment and maintenance, wherever necessary, so as to ensure the health and safety of persons. They must be chosen, designed and constructed in such a way as to be clearly visible and indelible.

Without prejudice to the provisions of road traffic regulations, machinery with a ride-on driver must have the following equipment:

- an acoustic warning device to alert persons,
- a system of light signals relevant to the intended conditions of use; the latter requirement does not apply to machinery intended solely for underground working and having no electrical power,
- where necessary, there must be an appropriate connection between a trailer and the machinery for the operation of signals.

Remote-controlled machinery which, under normal conditions of use, exposes persons to the risk of impact or crushing must be fitted with appropriate means to signal its movements or with means to protect persons against such risks. The same applies to machinery which involves, when in use, the constant repetition of a forward and backward movement on a single axis where the area to the rear of the machine is not directly visible to the driver.

Machinery must be constructed in such a way that the warning and signalling devices cannot be disabled unintentionally. Where it is essential for safety, such devices must be provided with the means to check that they are in good working order and their failure must be made apparent to the operator.

Where the movement of machinery or its tools is particularly hazardous, signs on the machinery must be provided to warn against approaching the machinery while it is working; the signs must be legible at a sufficient distance to ensure the safety of persons who have to be in the vicinity.

Response:

The machine features visible warning lights and acoustic buzzers to alert those around the machine to its presence and operation.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.6.2. Marking

Clause Requirements

The following must be shown legibly and indelibly on all machinery:

- nominal power expressed in kilowatts (kW),
 - mass of the most usual configuration, in kilograms (kg);
- and, where appropriate:
- maximum drawbar pull provided for at the coupling hook, in Newtons (N),
 - maximum vertical load provided for on the coupling hook, in Newtons (N).

Response:

Not applicable.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.6.3. Instructions

3.6.3.1. Vibrations

Clause Requirements

The instructions must give the following information concerning vibrations transmitted by the machinery to the hand-arm system or to the whole body:

- the vibration total value to which the hand-arm system is subjected, if it exceeds 2,5 m/s². Where this value does not exceed 2,5 m/s², this must be mentioned,
- the highest root mean square value of weighted acceleration to which the whole body is subjected, if it exceeds 0,5 m/s². Where this value does not exceed 0,5 m/s², this must be mentioned,
- the uncertainty of measurement.

These values must be either those actually measured for the machinery in question or those established on the basis of measurements taken for technically comparable machinery which is representative of the machinery to be produced.

Where harmonised standards are not applied, the vibration must be measured using the most appropriate measurement code for the machinery concerned. The operating conditions during measurement and the measurement codes used must be described.

Response:

There is no risk to the operator of exposure to excess vibration if the machine is used for its intended purpose and in its intended environment.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

3.6.3.2. Multiple uses

Clause Requirements

The instructions for machinery allowing several uses depending on the equipment used and the instructions for the interchangeable equipment must contain the information necessary for safe assembly and use of the basic machinery and the interchangeable equipment that can be fitted.

Response:

The machine has a single use.

Risk Estimation					Residual Risk
S	L	A	O	T	
1	1	1	1	4	None Identified.

Technical Information

Main Assembly Drawing

Please see design engineers files.

Bill of Materials

Please see manufacturers files.

Electrical Schematic

Please see manufacturers files

Hydraulic Schematic

Please see manufacturer's files.

Declarations of Conformity for Components

Please include the certificate of conformity for the system that charges the battery.

Test Results

As per site discussion with the manufacturer, the manufacturer has performed testing on lading and stability performance. Please see manufacturers files.

- Volts (V), Hertz (Hz), Kilowatts (kW), Amps (A)



It is prohibited to pre-date or post-date the machinery when affixing the CE marking.

Furthermore, machinery designed and constructed for use in a potentially explosive atmosphere must be marked accordingly.

Machinery must also bear full information relevant to its type and essential for safe use. Such information is subject to the requirements set out in section 1.7.1.

Where a machine part must be handled during use with lifting equipment, its mass must be indicated legibly, indelibly and unambiguously.

An example of a CE Machine Plate is shown below.

				
Ecovolve Ltd Dublin Road, Ballybrittas, Co. Laoise Ireland.				
Serial No:				
Name:				
Model No:				
Date of Issue:				
DC v: 24				

Reference Documents

The reference documents associated with this file are listed below:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- EN ISO 12100:2010 Safety of Machinery – General principles for design – Risk assessment and risk reduction
- EN 60204 Safety of machinery – electrical equipment of machines