Technical Construction File

File No:ZNCT250610001

According to 2006/42/EC Machinery Directive

EN ISO 12100 EN 792-3:2000+A1:2008

Related to the product: Electric tool drill bit

Applicant Name/Address:

ZHEJIANG ZHONGHUAN TOOLS Co., Ltd

Qingjiang Industrial Zone, Qingjiang Town, Yueqing City, Wenzhou City, Zhejiang Province

Trade mark: N/A

MODEL:

ZH/SDS-PLUS, ZH/SDS-PLUS03, ZH/SDS-PLUS04, ZH/SDS-PLUS05, ZH/SDS-PLUS05.5, ZH/SDS-PLUS06, ZH/SDS-PLUS6.5, ZH/SDS-PLUS07, ZH/SDS-PLUS08, ZH/SDS-PLUS09, ZH/SDS-PLUS10, ZH/SDS-PLUS10.5, ZH/SDS-PLUS11, ZH/SDS-PLUS12, ZH/SDS-PLUS12.5, ZH/SDS-PLUS13, ZH/SDS-PLUS14, ZH/SDS-PLUS15, ZH/SDS-PLUS16, ZH/SDS-PLUS16.5, ZH/SDS-PLUS17, ZH/SDS-PLUS18, ZH/SDS-PLUS19, ZH/SDS-PLUS20, ZH/SDS-PLUS22, ZH/SDS-PLUS24, ZH/SDS-PLUS25, ZH/SDS-PLUS26, ZH/SDS-PLUS28, ZH/SDS-PLUS30, ZH/SDS-PLUS32, ZH/SDS-PLUS35, ZH/SDS-PLUS38, ZH/SDS-MAX08, ZH/ZDS-MAX09, ZH/ZDS-MAX10, ZH/ZDS-MAX10.5, ZH/ZDS-MAX11, ZH/ZDS-MAX12 ZH/ZDS-MAX12.5, ZH/ZDS-MAX13, ZH/ZDS-MAX14, ZH/ZDS-MAX15, ZH/ZDS-MAX16, ZH/ZDS-MAX16.5, ZH/ZDS-MAX17, ZH/ZDS-MAX18, ZH/ZDS-MAX19, ZH/ZDS-MAX20, ZH/ZDS-MAX22, ZH/ZDS-MAX24, ZH/ZDS-MAX25, ZH/ZDS-MAX26, ZH/ZDS-MAX28, ZH/ZDS-MAX30, ZH/ZDS-MAX32, ZH/ZDS-MAX35, ZH/ZDS-MAX38, ZH/ZDS-MAX40, ZH/ZDS-MAX45, ZH/ZDS-MAX50, ZH/ZDS-MAX55, ZH/ZDS-MAX60, ZH/ZDS-MAX65, ZH\RHFH001, ZH\RHFH002, ZH\RHFH003, ZH\RHFH004, ZH\RHFH005, ZH/WFH001, ZH/WFH002, ZH/WFH003, ZH/WFH004, ZH/WFH005, ZH/HS001, ZH/FPC

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Content

Part I : ***General***
1.1 General description

This is **Electric tool drill bit**, It is a tool used to drill through holes or blind holes in solid materials and to expand existing holes.. Energy is Electrical power. Basically, this kind of machine belongs to dangerous machine and with risks when using it. All possible risk have been analysis in the risk assessment report and been prevent by suitable ways.
The main risk of this kind of machine could be:

1 Mechanical hazards created by casting products, related to the Automatic heat treatment machine(quenching and tempering).
2 Thermal hazards resulting in burns, scalds and other injuries, created by possible contact of persons with objects or materials with high temperature including the radiation of heat sources.
3 Noise hazards, resulting in hearing losses (deafness) and other physiological disorders (e.g. loss of balance, loss of awareness).
4 Vibration hazards (resulting in peripheral circulatory and nervous functional disturbances in the hand-arm system, such as the white finger disease).
5 Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts related to exhaust gases.
6 Fire or explosion hazards related to fuel spillage.
7 Hazards from neglect of ergonomic principles in machine design, such as hazards from unhealthy postures or excessive efforts and inadequate consideration of human hand-arm anatomy, related to handle design, machine balance and the use of spiked bumper.
8 Hazards from unexpected start-up, unexpected overrun/over-speed from failure/disorder of the control system related to failure in the handles and position of the controls.
9 Hazards from impossibility of stopping the machine in the best possible conditions related to the handle strength and position of the engine stopping device.
10 Hazards from failure of the control system related to handle strength, position of controls and marking.
11 Hazards from break-up (chain) during operation related to Linear servo robot.
12 Hazards from ejection of objects or fluids related to chip discharge and fuel spillage.

In order to prevent the main risks mentioned above, the protection guarding system are provided, and all the detail safety provision are constructed in accordance with the requirement of EN ISO 12100:2010 and.
In order to ensure the conformity for CE marking for these machines, some main European and/or International standards have been used to made assessment of conformity, they are：

－EN ISO 12100:2010 for checking of mechanical structures and carrying out risk assessment;
－EN 792-3:2000+A1:2008 Hand-held non-electric power tools — Safety requirements — Part 3: Drills and tappers

The test reports for these applicable standards in detail have been included in the relevant sub-clauses of this technical construction file.

1.2 Variations of the series products

Regarding the whole family of the series, they can be divided into various different groups according to their main features, they are:

ZH/SDS-PLUS, ZH/SDS-PLUS03, ZH/SDS-PLUS04, ZH/SDS-PLUS05,
ZH/SDS-PLUS05.5 ZH/SDS-PLUS06, ZH/SDS-PLUS6.5, ZH/SDS-PLUS07,
ZH/SDS-PLUS08, ZH/SDS-PLUS09, ZH/SDS-PLUS10, ZH/SDS-PLUS10.5,
ZH/SDS-PLUS11, ZH/SDS-PLUS12 ZH/SDS-PLUS12.5, ZH/SDS-PLUS13,
ZH/SDS-PLUS14, ZH/SDS-PLUS15, ZH/SDS-PLUS16, ZH/SDS-PLUS16.5,
ZH/SDS-PLUS17, ZH/SDS-PLUS18, ZH/SDS-PLUS19, ZH/SDS-PLUS20,
ZH/SDS-PLUS22, ZH/SDS-PLUS24, ZH/SDS-PLUS25, ZH/SDS-PLUS26,
ZH/SDS-PLUS28, ZH/SDS-PLUS30, ZH/SDS-PLUS32, ZH/SDS-PLUS35,
ZH/SDS-PLUS38, ZH/SDS-MAX08, ZH/ZDS-MAX09, ZH/ZDS-MAX10,
ZH/ZDS-MAX10.5, ZH/ZDS-MAX11, ZH/ZDS-MAX12 ZH/ZDS-MAX12.5,
ZH/ZDS-MAX13, ZH/ZDS-MAX14, ZH/ZDS-MAX15, ZH/ZDS-MAX16,
ZH/ZDS-MAX16.5, ZH/ZDS-MAX17, ZH/ZDS-MAX18, ZH/ZDS-MAX19,
ZH/ZDS-MAX20, ZH/ZDS-MAX22, ZH/ZDS-MAX24, ZH/ZDS-MAX25,
ZH/ZDS-MAX26, ZH/ZDS-MAX28, ZH/ZDS-MAX30, ZH/ZDS-MAX32,
ZH/ZDS-MAX35, ZH/ZDS-MAX38, ZH/ZDS-MAX40, ZH/ZDS-MAX45,
ZH/ZDS-MAX50, ZH/ZDS-MAX55, ZH/ZDS-MAX60, ZH/ZDS-MAX65,
ZH\RHFH001, ZH\RHFH002, ZH\RHFH003, ZH\RHFH004, ZH\RHFH005,
ZH/WFH001, ZH/WFH002, ZH/WFH003, ZH/WFH004, ZH/WFH005,
ZH/HS001, ZH/FPC

All models are with the same machine structure but with some small differences as described as the following:

13 The products dimension is different.
14 The weight of the machine is different.

To present the conformity of this series machine with Machinery Directive, we discuss the conformity systematically with the relative Directive and standards for CB as a basic evaluation in clause.

1.3 Quality control system

In order to ensure the conformity of the series production, the **ZHEJIANG ZHONGHUAN TOOLS Co., Ltd** has taken the related procedures mentioned below：

（1）Apply for the consultant form the qualified body in Italy.

The**ZHEJIANG ZHONGHUAN TOOLS Co., Ltd** has applied for the consultant from Technical Inspection Certification. The complete technical construction file（TCF）have been established before applying for the CE marking certificate.

（2）Carry out the inspection for parts and components according to the TCF

Before the assemblies of the series production, the QC engineers of **ZHEJIANG ZHONGHUAN TOOLS Co., Ltd** has to check and inspect the technical specifications and intended functions of parts and components to ensure the correct use of them according to the contents of TCF and principle described in the related technical information.

（3）Carry out the inspection＆ testing for the products before packing

Before packing the products, the QC engineers of **ZHEJIANG ZHONGHUAN TOOLS Co., Ltd** have to do the necessary inspection and testing to ensure the conformity of related requirements. In particular, they should do the testing and inspection of electrical characteristics and outer feature.

（4）Carry out the inspection for the package.

After the necessary inspection and testing for the products, an inspection for the packing has to be done to ensure the necessary elements being included in this packing before shipment.

（5）Provision for the change of design

Any change of the products described in this TCF must be checked in detail and written down again in the TCF by the designer of**ZHEJIANG ZHONGHUAN TOOLS Co., Ltd** if the change may effects the related electrical or mechanical characteristics.

（6）Provision for the Quality Assurance

For the provisions of internal control measures to ensure the conformity of series production of the machines,**ZHEJIANG ZHONGHUAN TOOLS Co., Ltd** has built an internal quality control system in accordance with the international standard of ISO-9001.
Sitaier does not apply for ND, a noise test report is attached.

1.4 List of applicable regulations and standards

Regulations
Machinery Directive. 2006/42/EC
EN ISO 12100: 2010 Safety of machinery — General principles for design — Risk assessment and risk reduction.
－EN 792-3:2000+A1:2008 Hand-held non-electric power tools — Safety requirements — Part 3: Drills and tappers

Part II：Assessment of conformity

2.1 Essential health and safety requirements

EHS R	Requirements	Description
1	Essential health and safety requirements	-
1.1	General remarks	-
1.1.1	Definitions	-
1.1.2	Principles of safety integration	-
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.	Pass. Automatic heat treatment machine(quenching and tempering) machine designed and constructed so that it is fitted for its function, and can be operated, adjusted and maintained under safety.
	The aim of measures taken must be to eliminate any risk throughout the foreseeable lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.	Pass.
b)	In selecting the most appropriate methods, the manufacturer or his authorized representative must apply the following principles, in the order given:	-
	- eliminate or reduce risks as far as possible (inherently safe machinery design and construction),	Pass. Effective means have been carried out for this purpose. With the machine is given a chain protection for transport and storage purpose.
	- take the necessary protective measures in relation to risks that cannot be eliminated	Pass. Machine has got both adequate front and rear hand protection.
	- 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.	Pass. There some program on the machine's case also adequate instruction are given in the owner manual.
c)	When designing and constructing machinery and when drafting the instructions, the manufacturer or his authorized representative must envisage not only the intended use of the machinery but also any reasonably foreseeable misuse thereof	Pass. The handbook contain instruction for safety use and maintenance also it contain warning and forbidden use.
	The machinery must be designed and constructed in such a way as to prevent abnormal use if such 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.	Pass. These requirements have been complied with rounded box, symbols for attention and warning, the related information also has been provided within the instruction manual.
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.	Pass. These requirements have been taken into account during the design of this machine. All controls can be operated while wearing protective gloves.
e)	Machinery must be supplied with all the special equipment and accessories essential to enable it to be adjusted, maintained and used safely.	Pass. No special tools are necessary for the machine.
1.1.3	Materials and products	-

EHS R	Requirements	Description
	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 draining	Pass. They cannot endanger exposed person's safety or health. Exhaust muffler is directed downwards to avoid operator's inhalation.
1.1.4	Lighting	-
	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	NA
	Machinery must be designed and constructed so that there is no area of shadow likely to cause nuisance, that there is no irritating dazzle and that there are no dangerous stroboscopic effects on moving parts due to the lighting	NA
	Internal parts requiring frequent inspection and adjustment, and maintenance areas must be provided with appropriate lighting.	NA
1.1.5	Design of machinery to facilitate its handling	-
	Machinery or each component part thereof must:	-
	- be capable of being handled and transported safely	Pass. The machine is adequately balanced, has got a suitable handle for transport purpose,
	- be packaged or designed so that it can be stored safely and without damage	Pass. Machine is equipped with chain removable protection.
	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	Pass. In the instruction book there is written that transportation or transfer to another location, with engine stop, so that no unexpected movements are possible.
	- either be fitted with attachments for lifting gear, or	NA
	- be designed so that it can be fitted with such attachments, or	NA
	be shaped in such a way that standard lifting gear can easily be attached	NA
	Where machinery or one of its component parts is to be moved by hand, it must:	-
	- either be easily movable, or	Machine is adequately balanced.
	- be equipped for picking up and moving safely.	Suitable handles are provided.
	Special arrangements must be made for the handling of tools and/or machinery parts which, even if lightweight, could be hazardous.	Machine is equipped with protection.
1.1.6	Ergonomics	-
	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	Pass. Intended use is in forest works by adults only.
	physical dimensions, strength and stamina	Pass. Machine is light and balanced.
	providing enough space for movements of the parts of the operator's body,	Pass. Handles are suitable for use with protective gloves.
	avoiding a machine-determined work rate,	NA
	avoiding monitoring that requires lengthy oncentration,	NA

EHS R	Requirements	Description
	adapting the man/machinery interface to the foreseeable characteristics of the operators.	Pass.
1.1.7	Operating positions	-
	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 oxygen.	Pass. The machine's muffler is directed downwards.
	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 hazards.	Not applicable the machinery is not intended to be used in a hazardous environment
	Where appropriate, the operating position must be fitted with an adequate cabin designed, constructed and/or equipped to fulfil the above requirements	NA
	The exit must allow rapid evacuation. Moreover, when applicable, an emergency exit must be provided in a direction which is different from the usual exit.	NA
1.1.8	Seating	-
	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	NA
	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.	NA
	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.	NA
	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.	NA
1.2	Controls	-
1.2.1	Safety and reliability of control systems	-
	in such a way as to prevent hazardous situations from arising.	Pass.
	Above all, they must be designed and constructed in such a way that:	The control system for this machine is safe and reliable.
	they can withstand the intended operating stresses and external influences	Pass.
	- a fault in the hardware or the software of the control system does not lead to hazardous situations,	pass
	errors in the control system logic do not lead to hazardous situations,	NA
	reasonably foreseeable human error during operation does not lead to hazardous situations.	Pass
	the machinery must not start unexpectedly,	Pass It has a lock
	the parameters of the machinery must not change in an uncontrolled way, where such change may lead to hazardous situations	Pass Hand control

EHS R	Requirements	Description
	the machinery must not be prevented from stopping if the stop command has already been given,	Pass Stop lever will close Electrical power so that it will stop immediately
	no moving part of the machinery or piece held by the machinery must fall or be ejected,	Pass
	automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,	Pass
	the protective devices must remain fully effective or give a stop command	Pass Hands' guards (front and rear) will remain in their position under all conditions.
	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	Pass
	For cable-less control, an automatic stop must be activated when correct control signals are not received, including loss of communication.	NA
1.2.2	Control devices	-
	Control devices must be:	-
	- clearly visible and identifiable, using pictograms where appropriate,	Pass. Lever for engine start are adequately identifiable on the machine, moreover the same pictogram is duplicated on the handbook.
	-positioned in such a way as to be safely operated without hesitation or loss of time and without ambiguity,	Pass. Control lever, star and stop button are protected by the hand guards.
	- designed in such a way that the movement of the control device is consistent with its effect,	Pass.
	-located outside the danger zones, except where necessary for certain control devices such as an emergency stop or a teach pendant,	Pass. All control devices have been located outside the danger zones.
	-positioned in such a way that their operation cannot cause additional risk,	Pass. All operation of control devices can't cause additional risk.
	- designed or protected in such a way that the desired effect, where a hazard is involved, can only be achieved by a deliberate action,	Pass. To turn on the engine is necessary open the switch, then pull the safety bar and then operate the tear-off switch.
	-made in such a way as to withstand foreseeable forces; particular attention must be paid to emergency stop devices liable to be subjected to considerable forces.	Pass. All controls (handle, safety bar, emergency stop, etc.) are made with state of art materials in order to withstand on foreseeable forces and environment conditions.
	Where a control device is designed and constructed to perform several different actions, namely where there is no one-to one correspondence, the action to be performed must be clearly displayed and subject to confirmation, where necessary.	NA
	Control devices must be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles.	Pass.
	Machinery must be fitted with indicators as required for safe operation. The operator must be able to read them from the control position.	NA

EHS R	Requirements	Description
	From each control position, the operator must be able to ensure that no-one is in the danger zones, or the control system must be designed and constructed in such a way that starting is prevented while someone is in the danger zone.	Pass. All controls are positioned in a safe zone.
	If neither of these possibilities is applicable, before the machinery starts, an acoustic and/or visual warning signal must be given. The exposed persons must have time to leave the danger zone or prevent the machinery starting up.	NA
	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.	NA
	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.	NA
	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.	NA
1.2.3	Starting	-
	It must be possible to start machinery only by voluntary actuation of a control provided for the purpose	Pass.
	The same requirement applies:	-
	- when restarting the machinery after stoppage, whatever the cause	Pass.
	- when effecting a significant change in the operating conditions	Pass.
	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.	NA
	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.	NA
	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 risks. 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.	NA
1.2.4	Stopping device	-
	Normal stopping	-
	Each machine must be fitted with a control whereby the machine can be brought safety to a complete stop	Pass. Normal stop can be obtained by releasing the safety bar.
	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.	NA

EHS R	Requirements	Description
	The machinery's stop control must have priority over the start controls.	Pass.
	Once the machinery or its hazardous functions have stopped, the energy supply to the actuators concerned must be cut off.	NA
	Operational stop	
	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.	Machine is equipped with a hold-to-run control used to allow chain running, it is possible to leave the engine on without chain movement in safe conditions.
	Emergency stop	-
	Machinery must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted.	Machine is equipped with an emergency stop button which cut off the electrical power to the spark so that the engine will stop immediately.
	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,	NA
	portable hand-held and/or handguided machinery.	
	The device must:	-
	- have clearly identifiable, clearly visible and quickly accessible control devices,	All controls are adequately identifiable.
	- stop the hazardous process as quickly as possible, without creating additional risks,	Pass.
	- where necessary, trigger or permit the triggering of certain safeguard movements.	NA
	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 restarting.	NA
	The emergency stop function must be available and operational at all times, regardless of the operating mode.	Pass. The emergency stop button is always active.
	Emergency stop devices must be a back-up to other safeguarding measures and not a substitute for them.	Pass. Machine is equipped with other safety equipment such as hands guards (front and rear) and safety bar.
1.2.4.4	Assembly of machinery	
	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, fits continued operation may be dangerous.	NA
1.2.5	Selection of control or operating modes	-

EHS R	Requirements	Description
	The control or operating mode selected must override all other control or operating modes, with the exception of the emergency stop.	NA
	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.	NA
1.2.6	Failure of the power supply	-
	The interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply to the machinery must not lead to a dangerous situation	Pass. Re-start it is possible only by voluntary action as for normal start.
	Particular attention must be given to the following points:	-
	- the machinery must not start unexpectedly	Pass.
	- the parameters of the machinery must not change in an uncontrolled way when such change can lead to hazardous situations,	Pass.
	- the machinery must not be prevented from stopping if the command has already been given,	Pass.
	no moving part of the machinery or piece held by the machinery must fall or be ejected,	Pass.
	- automatic or manual stopping of the moving parts whatever they may be must be unimpeded	Pass.
	- the protective devices must remain fully effective or give a stop command.	Pass.
1.3.1.	Risk of loss of stability	-
	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.	Pass. Reduced dimensions and weight allow easy and safe transport.
	If the shape of the machinery itself or its intended installation doesn't offer sufficient stability, appropriate means of anchorage must be incorporated and indicated in the instructions	Pass. Machine balance is guarantee by design.
1.3.2	Risk of break-up during operation	-
	The various parts of machinery and their linkages must be able to withstand the stress to which they are subject when used when as foreseen by the manufacturer	Pass. All parts of the machine can withstand related stress when they are used. Machine frame and cover are made with still and plastics with adequate tensile strength.
	The durability of the materials used must be adequate for the nature of the working environment foreseen by the manufacturer or his authorized representative , in particular as regards the phenomena of fatigue, ageing, corrosion and abrasion	Pass. All materials used for this machine are appropriate for their intended use.
	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 replacement.	Pass. The related information have been provided within the instruction manual.

EHS R	Requirements	Description
	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.	Pass. Warning and instruction are given in case of chain rupture. Also machine is provided with hands guards.
	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 rupture.	Pass.
	Where the material to be processed is fed to the tool automatically, the following conditions must be fulfilled to avoid risks to the persons exposed :	-
	- when the work piece comes into contact with the tool the later must have attained its normal working conditions	NA
	- when the tool starts and/or stops the feed movement and the tool movement must be coordinated	NA
1.3.3	Risked due to falling or ejected objects	-
	Precautions must be taken to prevent risks from falling or ejected object	Pass.
1.3.4	Risks due to surfaces, edges or angles	-
	In so far as their purpose allows, accessible parts of the machinery must have no sharp edges, no sharp angles, and no rough surfaces likely to cause injury	all accessible parts have no sharp edges, angle or rough surfaces.
1.3.5	Risks related to combined machinery	-
	Where the machinery is intended to carry out several different operations with the manual removal of the piece between each operation, it must be designed and constructed in such a way as to enable each element to be used separately without the other element constituting a danger or risk for the exposed person	NA
	For this purpose, it must be possible to start and stop separately and elements that are not protected	NA
1.3.6	Risks related to variations in operating conditions	-
	When the machine is designed to perform 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	NA
1.3.7	Prevention of risks related to moving parts	-
	The moving parts of machinery must be designed, built and laid out to avoid hazards or, where hazards persist, fixed with guards or protective devices in such a way as to prevent all risk of contact which could lead to accidents	Pass. These kinds of contacts have been prevented by appropriate guards.
	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 unblocked.	Pass. Kickback risk was been taken in account and prevented adequately.
	The instructions and, where possible, a sign on the machinery shall identify these specific protective devices and how they are to be used.	Pass. The handbook contains all necessary information to avoid dangerous situation.

EHS R	Requirements	Description
1.3.8	Choice of protection against risk related to moving parts	-
	Guards or protection devices used to protect against the risks related to moving parts must be selected on the basis of the type of risk	Pass. It is in accordance with the risk assessment. Machine has got rear and front hand protections.
	The following guidelines must be used to help make the choice	-
	A. Moving transmission parts Guards designed to protect exposed persons against the risks associated with moving transmission parts must be：	-
	- either fixed, complying with requirements 1.4.1 and 1.4.2.1 or	See the related clauses.
	- interlocking movable guards as referred to in section 1.4.2.2.	See the related clauses.
1.3.8.2	Moving parts involved in the process	
	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	See the related clauses.
	- interlocking movable guards as referred to in section 1.4.2.2, or	See the related clauses.
	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 can't be completely or partially inaccessible during operation owing to operations requiring near-by operator intervention, where technically possible 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,	Pass
	- adjustable guards as referred to in section 1.4.2.3 restricting access to those sections of the moving	See the related clauses.
	parts where access is necessary.	
1.3.9	Risks of uncontrolled movements	
	When a part of the machinery has been stopped, any drift away from the stopping position, for whatever reason other than action on the control devices, must be prevented or must be such that it does not present a hazard	NA
1.4	Required characteristics of guards and protection devices	-
1.4.1	General requirement	-
	Guards and protection devices must:	-
	- be of robust construction	Pass.
	- be securely held in place,	Pass.
	- not be easy to bypass or render non-operational	Pass.
	- be located at an adequate distance from the danger zone	Pass.
	- cause minimum obstruction to the view id the production process	Pass.
	- In addition, guards must, where possible, protect against the ejection or falling of materials or objects and against emissions generated by the machinery.	Pass.
1.4.2	Special requirements for guards	-
1.4.2.1	Fixed guards	-

EHS R	Requirements	Description
	Fixed guards must be fixed by systems that can be opened or removed only with tools.	Pass. They all be securely held in place.
	They must be fixed by system that can be opened only with tools	Pass. They all can be opened only with tools.
	Their fixing systems must remain attached to the guards or to the machinery when the guards are removed.	Pass.
	Where possible, guards must be unable to remain in place without their fixings	Pass.
1.4.4.2	Interlocking movable guards must:	NA
1.4.2.3	Adjustable guards restricting access	NA
1.4.3	Special requirements for protection devices	-
	Protection devices must be designed and incorporated into the control system so that:	-
	- moving parts can't start up while they are within the operator's reach	NA
	- the exposed person can't reach moving parts once they have started up	NA
	- they can be adjusted only by means of an intentional action, such as the use of a tool, etc.	NA
	-the absence or failure of one of their components prevents starting or stops the moving parts	NA
1.5	Protection against other hazards	-
	Electricity supply	-
	Where machinery has an electricity supply it must be designed, constructed and equipped so that all hazards of an electrical nature are or can be prevented	Pass. Spark cable and spark itself are adequately protected.
	The safety objectives set out in Directive 73/23/EEC shall apply to machinery. However, the obligations concerning conformity assessment and the placing on the market and/or putting into service of machinery with regard to electrical hazards are governed solely by this Directive.	NA
1.5.2	Static electricity	-
	Machinery must be so designed and constructed as to prevent or limit the build-up of potentially dangerous electrostatic changes and/or be fitted with a discharging system	NA
1.5.3	Energy supply other than electricity	-
	Where machinery is powered by an energy other than electricity, it must be so designed, constructed and equipped as to avoid all potential hazards associated with these types of energy	Pass.
1.5.4	Error of fitting	
	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.	Pass. The handbook contains all instruction for chain replacement.
	Where necessary, the instructions must give further information on these risks.	Pass.

EHS R	Requirements	Description
	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.	NA
1.5.5	Extreme temperatures	-
	Step must be taken to eliminate any risk of injury caused by contact with or proximity to machinery parts or materials at high or very low temperatures	Pass. Sufficient safety protection for extreme temperatures has been provided on the engine and muffler.
	The necessary steps must also be taken to avoid or protect against the risk of hot or very cold material being ejected.	NA
1.5.6	Fire	-
	Machinery must be designed and constructed to avoid all risk of fire or overheating posed by the machinery itself or by gases, liquids, dusts, vapours or the other substances produced or used by the machinery	Pass. The design and construction of this machine are in conformity with these requirements.
1.5.7	Explosion	-
	Machinery must be designed and constructed to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dusts, vapours or other substances produced or used by the machinery	Pass. The design and construction of this machine are in conformity with these requirements.
	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.	
1.5.8	Noise	-
	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 source.	Pass. The design and construction of this machine are in conformity with this requirements.
	The level of noise emission may be assessed with reference to comparative emission data for similar machinery.	Pass. Noise emission has been measured and declared in the handbook.
1.5.9	Vibration	-
	Machinery must be so designed and constructed	Pass.
	that risks resulting from the 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	
	The level of vibration emission may be assessed with reference to comparative emission data for similar machinery.	Pass. Hand-arm vibration has been measured and declared in the handbook.
1.5.10	Radiation	-
	Undesirable radiation emissions from the machinery must be eliminated or be reduced to levels that do not have adverse effects on persons	Pass. EMC test report confirm a low level emission (see below).
	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.	NA
	Any functional non-ionising radiation emissions during setting, operation and cleaning must be limited to levels that do not have adverse effects on persons.	NA
1.5.11	External radiation	-

EHS R	Requirements	Description
	Machinery must be so designed and constructed that external radiation doesn't interfere with its operation	Pass. Machine is not influenced by external radiation.
1.5.12	Laser equipment	-
	Where laser equipment is used, the following provisions should be taken into account;	NA
	- laser equipment on machinery must be designed and constructed so as to prevent any accidental radiation	NA
	- laser equipment on machinery must be protected so that effective radiation, radiation produced by reflection or diffusion and secondary radiation don't damage health	NA
	-optical equipment for the observation or adjustment of laser equipment on machinery must be such that no health risk is created by the laser rays	NA
1.5.13	Emissions of hazardous materials and substances	-
	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 avoided.	Pass. These risks can be avoid by using the appropriate guards. The exhaust mu7ffles is directed far away from operator face.
	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.	NA
	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 effect.	NA
1.5.14	Risk of being trapped in a machine	-
	Machinery must be so designed, constructed or fitted with a means of preventing a exposed person from being enclosed within it or, if that is impossible, with a means of summoning held	NA
1.5.15	Risk of slipping, tripping or falling	-
	Parts of the machinery where persons are liable to move about or stand must be designed and constructed to prevent persons slipping, tripping or falling on or off these parts	NA
	Where appropriate, these parts must be fitted with handholds that are fixed relative to the user and that enable them to maintain their stability.	NA
1.5.16	Lightning	
	Machinery in need of protection against the effects of lightning while being used must be fitted with a system for conducting the resultant electrical charge to earth.	NA
1.6	Maintenance	-
1.6.1	Machinery maintenance	-
	Adjustment, lubrication and maintenance points must be located outside danger zones.	Pass. All maintenance point are located outside of danger zone. However chain sharpening must be carried out with the chain dismantled, adequate instruction is given in the handbook.
	It must be possible to carry out adjustment, Maintenance, repair, cleaning and servicing Operations while machinery is at a standstill.	Pass.

EHS R	Requirements	Description
	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).	NA
	In the case of automated machinery and, where necessary, other machinery, a connecting device for mounting diagnostic fault-finding equipment must be provided.	NA
	Automated machinery components which have to be changed frequently must be capable of being removed and replaced easily and safely.	NA
	Access to the components must enable these tasks to be carried out with the necessary technical means in accordance with a specified operating method.	Pass. All operation methods have been specified by the manufacturer.
1.6.2	Access to operating position and servicing points	-
	Machinery must be designed and constructed in such a way as to allow access in safety to all areas where intervention is necessary during operation, adjustment and maintenance of the machinery.	Pass. Appropriate guards and safety control devices have been used.
1.6.3	Isolation of energy sources	-
	All machinery must be fitted with means to isolate it from all energy sources	Pass. The power switch has been implemented.
	Such isolators must be clearly identified	Pass. It has been identified clearly.
	They must be capable of being locked if reconnection could endanger exposed persons	NA
	In the case of machinery supplied with electricity through a plug capable of being plugged into a circuit, separation of the plug is sufficient	NA
	The isolator must be capable of being locked also where an operator is unable, from any of the points to which he has access, to check that the energy is still cut off	NA
	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 removed.	NA
	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.	NA
	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.	NA
1.6.4	Operator intervention	-
	Machinery must be so designed, constructed and equipped that the need for operator intervention is limited	Pass.
	If operator intervention can’t be avoided, it must be possible to carry it out easily and in safety	Pass.
1.6.5	Cleaning of internal parts	-

EHS R	Requirements	Description
	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 outside. 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.	NA
1.7	Indicators	-
	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. [Compare with 1.7.2 of the old directive]	NA
1.7.1	Information and information devices	
	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 operator.	Pass. Handbook will contain information for safety use, as well pictures, pictograms, and warning symbols.
	Visual display units or any other interactive means of communication between the operator and the machine must be easily understood and easy to use.	NA
1.7.2	Warning devices	-
	Where risks remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, must be provided	NA
1.7.3	Marking of machinery	-
	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 authorized representative,	Pass.
	- designation of the machinery,	Pass.
	- the CE Marking (see Annex III),	Pass. It will be marked after CE certificate.
	- designation of series or type,	Pass.
	serial number, if any,	Pass
	the year of construction, that is the year in which the manufacturing process is completed.	Pass
	It is prohibited to pre-date or post-date the machinery when affixing the CE marking.	Pass
	Furthermore, machinery designed and Constructed for use in a potentially explosive atmosphere must be marked accordingly.	Pass
	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.	Pass.
	Where a machine part must be handled during use with lifting equipment, its mass must be indicated legible, indelibly and unambiguously	NA

EHS R	Requirements	Description
	The interchangeable equipment referred to in Article 1（2）, third subparagraph, must bear the same information	Pass.
1.7.4	Instruction	-
	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.	Pass It has English instruction. Seller will provide for necessary translation.
	- 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.	Pass.
	-By way of exception, the maintenance instructions intended for use by specialized personnel mandated by the manufacturer or his authorized representative may be supplied in only one Community language which the specialized personnel understand.[Compare with old 1.7.4 b]	Pass.
	- The instructions must be drafted in accordance with the principles set out below.	Pass.
1.7.4.1	General principles for the drafting of instructions	
	- (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 authorized representative.	Pass.
	- (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 authorized 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'.	Pass.
	- (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 authorized 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'.	NA
	(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.	Pass
	(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.	Pass
1.7.4.2	Contents of the instructions	
	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 authorized representative;	Pass See instruction.
	(b) the designation of the machinery as marked on the machinery itself, except for the serial number (see section 1.7.3);	Pass See instruction.

EHS R	Requirements	Description
	(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;	Pass See Annex.
	(d) a general description of the machinery;	Pass See instruction.
	(e) the drawings, diagrams, descriptions and explanations necessary for the use, maintenance and repair of the machinery and for checking its correct functioning;	Pass See instruction.
	(f) a description of the workstation(s) likely to be occupied by operators;	Pass See instruction.
	g) a description of the intended use of the machinery;	Pass See instruction.
	(h) warnings concerning ways in which the machinery must not be used that experience has shown might occur;	Pass See instruction.
	(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;	Pass See instruction.
	(j) instructions relating to installation and assembly for reducing noise or vibration;	Pass See instruction.
	(k) instructions for the putting into service and use of the machinery and, if necessary, instruct	Pass See instruction.
	(l) information about the residual risks that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted;	Pass See instruction.
	(m) instructions on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided	Pass See instruction.
	(n) the essential characteristics of tools which may be fitted to the machinery;	Pass See instruction.
	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;	Pass See instruction.
	(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; [Compare with the 10th hyphen of old 1.7.4. (a)]	Pass See instruction.
	(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	Pass See instruction.
	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;	Pass See instruction.
	(s) instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;	Pass See instruction.
	(t) the specifications of the spare parts to be used, when these affect the health and safety of operators;	Pass See instruction.

EHS R	Requirements	Description
	(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,	NA
	the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 μPa),	Pass
	the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).	the A-weighted sound power level emitted is 72 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 machinery which is representative of the machinery to be produced.	Pass
	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.	Pass
	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.	Pass
	The operating conditions of the machinery during measurement and the measuring methods used must be described.	Pass
	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 metre from the floor or access platform. The position and value of the maximum sound pressure must be indicated.	NA
	Where specific Community Directives lay down other requirements for the measurement of sound	NA
	pressure levels or sound power levels, those Directives must be applied and the corresponding provisions of this section shall not apply;	
	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.	NA
1.7.4.3	Sales literature	
	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 instructions.	Pass See instruction.
	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS FOR CERTAIN CATEGORIES OF MACHINERY	

EHS R	Requirements	Description
	Foodstuffs machinery, machinery for cosmetics Or pharmaceutical products, handheld and/or hand-guided machinery, portable fixing and other impact machinery, machinery for working wood and material with similar physical characteristics must meet all the essential health and safety requirements described in this chapter (see General Principles, point 4).	NA
2	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS FOR CERTAIN CATEGORIES OF MACHINERY	
2.2	*Portable hand-held and/or hand-guided machinery*	
2.2.1	General	
	Portable hand-held and/or hand-guided machinery must:	
	depending on the type of machinery, have a supporting surface of sufficient size and have a sufficient number of handles and supports of an appropriate size, arranged in such a way as to ensure the stability of the machinery under the intended operating conditions,	Pass. The machine has got two handle, suitable while it is used or transported.
	except where technically impossible, or where there is an independent control device, in the case of handles which cannot be released in complete safety, be fitted with manual start and stop control devices arranged in such a way that the operator can operate them without releasing the handles,	Pass. When handle is released the engine automatically stops.
	present no risks of accidental starting and/or continued operation after the operator has released the handles.	Pass.
	Equivalent steps must be taken if this requirement is not technically feasible, permit, where necessary, visual observation of the danger zone and of the action of the tool with the material being processed.	NA
	The handles of portable machinery must be designed and constructed in such a way as to make starting and stopping straightforward.	Pass.
2.2.1.1	Instructions	
	The instructions must give the following information concerning vibrations transmitted by portable hand-held and handguided machinery	
	the vibration total value to which the hand-arm system is subjected, if it exceeds 2,5 m/s^2. Where this value does not exceed 2,5 m/s^2, this must be mentioned, the uncertainty of measurement.	Hand-arm vibration measured is 0.2 m/s^2.
2.2.2	Portable fixing and other impact machinery	NA
2.3	MACHINERY FOR WORKING WOOD AND MATERIAL WITH SIMILAR PHYSICAL CHARACTERISTICS	
	Machinery for working wood and materials with similar physical characteristics must comply with the following requirements:	NA
	(a) the machinery must be designed, constructed or equipped in such a way that the piece being machined can be placed and guided in safety; where the piece is hand-held on a work-bench, the latter must be sufficiently stable during the work and must not impede the movement of the piece;	NA

EHS R	Requirements	Description
	(b) where the machinery is likely to be used in conditions involving the risk of ejection of workpieces or parts of them, it must be designed, constructed, or equipped in such a way as to prevent such ejection, or, if this is not possible, so that the ejection does not engender risks for the operator and/or exposed persons;	NA
	(c) the machinery must be equipped with an automatic brake that stops the tool in a sufficiently short time if there is a risk of contact with the tool whilst it runs down;	NA
	(d) where the tool is incorporated into a non-fully automated machine, the latter must be designed and constructed in such a way as to eliminate or reduce the risk of accidental injury.	NA
3	Essential health and safety requirement to offset the particular hazards due to the mobility machinery	NA
4	Essential health and safety requirement to offset the particular hazards due to a lifting operation	NA
5	Essential health and safety requirement for machinery intended for underground work	NA
6	Essential health and safety requirement to offset the particular hazards due to the lifting or moving of persons	NA

2.2 Risk assessment

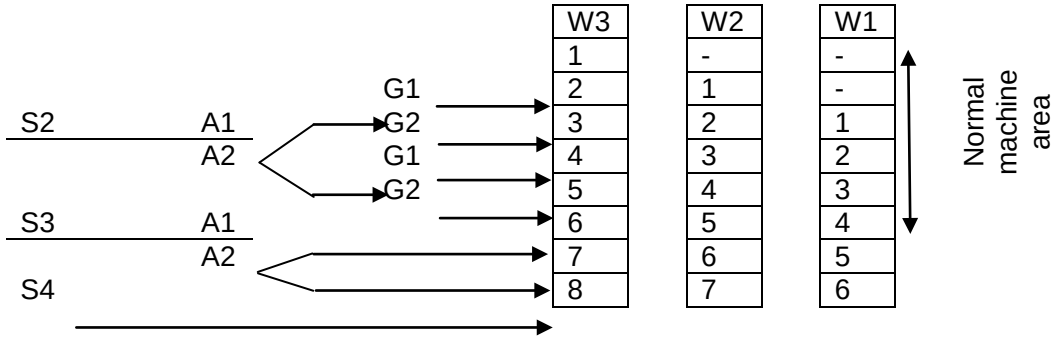
This risk assessment report is based on the methods in the EN 12100:2010, and the 4 factors S-A-G-W have been used for evaluating the level of risks.

S：Severity of possible harm
- S1：Slight（normally reversible）
- S2：Serious（normally irreversible）
- S3：Cause a few men die
- S4：Calamity or cause many men die

A：Frequency any duration of exposure
- A1：Seldom to very often
- A2：Frequent to continuous

G：Possibilities of avoidance
- G1：Possible
- G2：Impossible

W：Probability of occurrence of harm
- W1：Low
- W2：Medium
- W3：High



NO.	Hazards source	S	A	G	W	Level
	Mechanical hazards					
1.0-1	Mechanical hazards due to machine parts or					
	work pieces					
1.0-2	Mechanical hazards due to accumulation of					
	energy inside the machinery					
1.1	Crushing					
1.2	Shearing					
1.3	Cutting or severing	**2**	**1**	**1**	**1**	**1**
1.4	Entanglement					
1.5	Drawing-in or trapping	***2***	***1***	***1***	***3***	***2***
1.6	Impact	***1***	***1***	***1***	***1***	**-**
1.7	Stabbing or puncture	***1***	***1***	***1***	***1***	**-**
1.8	Friction or abrasion					
1.9	High pressure fluid injection or ejection					
	Electrical hazards					
2.1	Contact with live parts					
2.2	Contact with parts which have become live under faulty conditions					
2.3	Approach to live part under high voltage					
2.4	Electrostatic phenomena					
2.5	Thermal radiation or other phenomena such as projection of molten particles and chemical effects form short-circuits, overloads etc.					
	Thermal hazards					
3.1	Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	***1***	***1***	***1***	***1***	**-**
3.2	Damage to health by hot or cold working environment					
	Hazards generated by noise					
4.1	Hearing loss (deafness), other physiological disorders	**1**	**1**	**1**	**1**	**-**
4.2	Interference with speech communication, acoustic signals, etc.					
	Hazards generated by vibration					
5.1	Use of hand-help machines resulting in a variety of neurological and vascular disorder	**1**	**1**	**1**	**1**	**-**
5.2	Whole body vibration, particular when combined with poor postures					
	Hazards generated by radiation					
6.1	Low frequency, radio frequency radiation, microwaves					
6.2	Infrared, visible and ultraviolet light					
6.3	X and gamma rays					
6.4	Alpha, beta rays, electron or ion beams, neutrons					
6.5	Lasers					
	Hazards generated by materials and substances processed or used by the machinery					
7.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	**1**	**1**	**1**	**1**	**-**
7.2	Fire and explosion hazard	**1**	**1**	**1**	**1**	**-**
7.3	Biological and micro-biological (viral or bacterial) hazards					
	Hazards generated by neglecting ergonomic principles in machine design					
8.1	Unhealthy postures or excessive effort	**1**	**1**	**1**	**1**	**-**

NO.	Hazards source	S	A	G	W	Level
8.2	Inadequate consideration of hand-arm or foot-leg anatomy	**1**	**1**	**1**	**1**	**-**
8.3	Neglected use of personal protection equipment					
8.4	Inadequate local lighting					
8.5	Mental overload or underload, stress					
8.6	Human error, human behavior	***1***	***1***	***1***	***1***	**-**
8.7	Inadequate design, location or identification of manual controls					
8.8	Inadequate design, location or identification of manual controls					
	Combination of hazards					
9	Combination of hazards					
	Unexpected start-up, unexpected overrun/over-speed					
10.1	Failure/disorder of the control system	***1***	***1***	***1***	***1***	**-**
10.2	Restoration of energy on supply after an interruption					
10.3	External influences on electrical equipment					
10.4	Other external influences (gravity, wind, etc.)					
10.5	Errors in the software					
10.6	Error made by the operator (due to mismatch of machinery with human characteristics and abilities, see 8.6)					
	Impossibility of stopping the machine in the best possible conditions					
11	Impossibility of stopping the machine in the best possible conditions	***1***	***1***	***1***	***1***	**-**
	Variations in the rotational speed of tools					
12	Variations in the rotational speed of tools					
	Failure of the power supply					
13	Failure of the power supply					
	Failure of the control circuit					
14	Failure of the control circuit	***1***	***1***	***1***	***1***	**-**
	Errors of fitting					
15	Errors of fitting					
	Break-up during operation					
16	Break-up during operation	***1***	***1***	***1***	***1***	**-**
	Falling or ejected objects or fluids					
17	Falling or ejected objects or fluids	***1***	***1***	***1***	***1***	**-**
	Loss of stability / overturning of machinery					
18	Loss of stability / overturning of machinery					
	Slip, trip and fall of persons (related to machinery)					
19	Slip, trip and fall of persons(related to machinery)					
	Additional hazards, hazardous situations and hazardous events due to mobility					
20	Relating to the travelling function					
20.1	Movement when starting the engine					
20.2	Movement without a driver at the driving position					
20.3	Movement without all parts in a safe position					
20.4	Excessive speed of pedestrian controlled machinery					
20.5	Excessive oscillations when moving					
20.6	Insufficient ability of machinery to be slowed down, stopped and immobilisated					
	Linked to the work position (including driving station) on the machine					

NO.	Hazards source	S	A	G	W	Level
21.1	Fall of persons during access to (or at/from) the work position					
21.2	Exhaust gases/lack of oxygen at the work position					
21.3	Fire（flammability of the cab, lack of extinguishing means）					
21.4	Mechanical hazards at the work position： contact with the wheels； rollover； fall of objects, penetration by objects； break-up of parts rotation at high speed； contact of persons with machine parts or tools（pedestrian controlled machines）					
21.5	Insufficient visibility form the work positions					
21.6	Inadequate lighting					
21.7	Inadequate seating					
21.8	Noise at the work position					
21.9	Vibration at the work position					
21.10	Insufficient means for evacuation/emergency exit					
	Due to the control system					
22.1	Inadequate location of manual controls					
22.2	Inadequate design of manual controls and their mode of operation					
	Form handling the machine（lack of stability）					
23	Form handling the machine（lack of stability）					
	Due to the power source and to the transmission of power					
24.1	Hazards form the engine and the batteries					
24.2	Hazards form the transmission of power between machines					
24.3	Hazards form coupling and towing					
	Form/to third persons					
25.1	Unauthorized start-up/use	***1***	***1***	***1***	***2***	**-**
25.2	Drift of a part away from its stopping position					
25.3	Lack or inadequacy of visual or acoustic warning means					
	Insufficient instructions for the driver/operator					
26	Insufficient instructions for the driver/operator	***1***	***1***	***1***	***1***	**-**
	Additional hazards, hazardous situations and hazardous events due to lifting					
27	Mechanical hazards and hazardous events					
27.1	Form load falls, collisions, machine tipping caused by：					
27.1.1	Lack of stability					
27.1.2	Uncontrolled loading-overloading-overturning moments exceeded					
27.1.3	Uncontrolled amplitude of movements					
27.1.4	Unexpected/unintended movement of loads					
27.1.5	Inadequate holding devices/accessories					
27.1.6	Collision of more then one machine					
27.2	Form access of persons to load support					
27.3	Form derailment					
27.4	Form insufficient mechanical strength of parts					
27.5	Form inadequate selection of chains, ropes, lifting and accessories and their inadequate integration into the machine					
27.6	Form inadequate selection of chains, ropes, lifting and accessories and their inadequate integration into the machine					
27.7	Form lowering of the load under the control of friction brake					
27.8	Form abnormal conditions of assembly/testing/use/maintenance					
27.9	Form the effect of load on persons（impact by load or counterweight）					

NO.	Hazards source	S	A	G	W	Level
	Electrical hazards					
28.1	Form lightning					
	Hazards generated by neglecting ergonomic principles					
29.1	Insufficient visibility from the driving position					
	Additional hazards, hazardous and situations and hazardous events due to underground work					
30	Mechanical hazards and hazardous events due to:					
30.1	Lack of stability of powered roof supports					
30.2	Failing accelerator or brake control of machinery running on rails					
30.3	Failing or lack of dead man’s control of machinery running on rails					
31	Restricted movement of persons					
32	Fire and explosion					
33	Emission of dust, gases etc.					
	Additional hazards, hazardous situations and hazardous events due to the lifting or moving of persons					
34	Mechanical hazards and hazardous events due to:					
34.1	Inadequate mechanical strength-inadequate working coefficients					
34.2	Failing of loading control					
34.3	Failing of controls in person carrier (function, priority)					
34.4	Over speed of person carrier					
35	Falling of person from person carrier					
36	Falling or overturning of person carrier					
37	Human error, human behavior					

NO.	Hazards source	S	A	G	W	Level
1.3	**Cutting or severing**	2	1	1	1	1
Where	Chain					
When	Operation, adjustment or maintenance of the machine					
	Method					
1.	*Edit the instruction manual in conformity with those requirement of Machinery Directive and EN ISO 12100-2 standard*					
2.	*Each machine accompanied with a complete instruction manual*					
3.	*Read instruction manual before operate the machine*					
	Result					
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
1.5	**Drawing-in or trapping**	2	1	1	3	2
Where	Rotation parts (cloth winder etc……)					
When	Operator opens the cover/guard during operation					
	Method					
1.	*Use the movable guard with interlocking*					
2.	*When the movable guard been opened will stop the rotation of the cloth winder*					
3.	*Read instruction manual before operate the machine*					
	Result	1	1	1	1	-
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
1.6	**Impact**	1	1	1	1	-
Where	Whole machine					
When	Installation, assembly/disassembly, operation, adjustment or maintenance of the machine					
	Method					
1.	*Edit the instruction manual in conformity with those requirement of Machinery Directive and EN ISO 12100-2 standard*					
2.	*Each machine accompanied with a complete instruction manual*					
3.	*Only operation by training/authorized persons*					
	Result	1	1	1	1	-
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
1.7	Stabbing or puncture	1	1	1	1	-
Where	Knitting parts					
When	Operator access to the knitting parts during operation					
	Method					
1.	Affixing suitable warning signs					
2.	Read instruction manual before operate the machine					
3.	///					
	Result	1	1	1	1	-
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
3.1	Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	1	1	1	1	-
Where	Whole machine					
When	Operation, adjustment or maintenance of the machine					
	Method					
1.	*Edit the instruction manual in conformity with those requirement of Machinery Directive and EN ISO 12100-2 standard*					
2.	*Each machine accompanied with a complete instruction manual.*					

NO.	Hazards source	S	A	G	W	Level
3.	///					
	Result	1	1	1	1	-
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
4.1	Hearing loss (deafness), other physiological disorders	1	1	1	1	-
Where	Whole machine					
When	Operation, adjustment or maintenance of the machine					
	Method					
1.	*Edit the instruction manual in conformity with those requirement of Machinery Directive and EN ISO 12100-2 standard*					
2.	*Advice operators to take earplug*					
3.	///					
	Result	1	1	1	1	-
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
5.1	Use of hand-help machines resulting in a variety of neurological and vascular disorder	1	1	1	1	-
Where	Whole machine					
When	Operation					
	Method					
1.	*Edit the instruction manual in conformity with those requirement of Machinery Directive and EN ISO 12100-2 standard*					
2.	*Only operation by training/authorized persons*					
3.	///					
	Result	1	1	1	1	-
NO.	**Hazards source**	**S**	**A**	**G**	**W**	**Level**
7.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	1	1	1	1	-
Where	Whole machine					
When	Installation, assembly/disassembly, operation, adjustment or maintenance of the machine					
	Method					
1.	*Edit the instruction manual in conformity with those requirement of Machinery Directive and EN ISO 12100-2 standard*					
2.	*Only operation by training/authorized persons*					
3.	///					
	Result	1	1	1	1	-

Clause	EN ISO 12100: 2010	Result
6	**Risk reduction**	**-**
6.1	General	**-**
	The objective of risk reduction can be achieved by the elimination of hazards, or by separately or simultaneously reducing each of the two elements that determine the associated risk: _ severity of harm from the hazard under consideration; _ probability of occurrence of that harm. All protective measures intended for reaching this objective shall be applied in the following sequence, referred to as the three-step method (see also Figures 1 and 2).	**-**Pass. This requirement is complied with designing the charging machine according to and giving adequate instruction for safety use.
6.2	Inherently safe design measures	
6.2.1	General	-
	Inherently safe design measures are the first and most important step in the risk reduction process because protective measures inherent to the characteristics of the machine are likely to remain effective, whereas experience has shown that even well-designed safeguarding may fail or be violated and information for use may not be followed.	Pass. Safety guards for front and rear hand are made according to en 10218
	Inherently safe design measures are achieved by avoiding hazards or reducing risks by a suitable choice of design features of the machine itself and/or interaction between the exposed persons and the machine. NOTE See 6.3 for safeguarding and complementary measures that can be used to achieve the risk reduction objectives in the case where inherently safe design measures are not sufficient (see 6.1 for the three-step method).	Pass.
6.2.2	Consideration of geometrical factors and physical aspects	-
6.2.2.1	Geometrical factors	-
	Such factors include the following.	-
	a) The form of machinery is designed to maximize direct visibility of the working areas and hazard zones from the control position — reducing blind spots, for example — and choosing and locating means of indirect vision where necessary (mirrors, etc.) so as to take into account the characteristics of human vision, particularly when safe operation requires permanent direct control by the operator, for example: _ the travelling and working area of mobile machines; _ the zone of movement of lifted loads or of the carrier of machinery for lifting persons; _ the area of contact of the tool of a hand-held or hand-guided machine with the material being worked. The design of the machine shall be such that, from the main control position, the operator is able to ensure that there are no exposed persons in the danger zones.	Pass. Appropriate machine design has been performed by the manufacturer.
	b) The form and the relative location of the mechanical components parts: for instance, crushing and shearing hazards are avoided by increasing the minimum gap between the moving parts, such that the part of the body under consideration can enter the gap safely, or by reducing the gap so that no part of the body can enter it (see ISO 13854 and ISO 13857).	Pass. Appropriate machine design has been performed by the manufacturer.

Clause	EN ISO 12100: 2010	Result
	c) Avoiding sharp edges and corners, protruding parts: in so far as their purpose allows, accessible parts of the machinery shall have no sharp edges, no sharp angles, no rough surfaces, no protruding parts likely to cause injury, and no openings which can “trap” parts of the body or clothing. In particular, sheet metal edges shall be deburred, flanged or trimmed, and open ends of tubes which can cause a “trap” shall be capped.	Pass. Appropriate machine design has been performed by the manufacturer.
	d) The form of the machine is designed so as to achieve a suitable working position and provide accessible manual controls (actuators).	Pass. Appropriate machine design has been performed by the manufacturer.
6.2.2.2	Physical aspects	-
	Such aspects include the following:	-
	a) limiting the actuating force to a sufficiently low value so that the actuated part does not generate a mechanical hazard;	Pass. Safety bar can be easy held in work position without excessive efforts.
	b)limiting the mass and/or velocity of the movable elements, and hence their kinetic energy;	Pass. A good balancing reduce the effect of kinetic energy.
	- c) limiting the emissions by acting on the characteristics of the source using measures for reducing 1) noise emission at source (see ISO/TR 11688-1), 2) the emission of vibration at source, such as redistribution or addition of mass and changes of process parameters [for example, frequency and/or amplitude of movements (for hand-held and hand-guided machinery, see CR 1030-1)], 3) the emission of hazardous substances, including the use of less hazardous substances or dust-reducing processes (granules instead of powders, milling instead of grinding), and 4) radiation emissions, including, for example, avoiding the use of hazardous radiation sources, limiting the power of radiation to the lowest level sufficient for the proper functioning of the machine, designing the source so that the beam is concentrated on the target, increasing the distance between the source and the operator or providing for remote operation of the machinery [measures for reducing emission of non-ionizing radiation are given in 6.3.4.5 (see also EN 12198-1 and EN 12198-3)].	Pass. Very high quality bearing and adequate muffler have been used to reduce noise emission by design.
6.4.3	Taking into account the general technical knowledge regarding machine design	-
	This general technical knowledge can be derived from technical specifications for design (e.g. standards, design codes, calculation rules).These should be used to cover :	Pass.
	a) mechanical stresses such as	-
	-stress limitation by implementation of correct calculation, construction and fastening methods as regards, e.g. bolted assemblies, welded assemblies	Pass.
	- stress limitation by overload prevention, (e.g. “fusible” plugs, pressure-limiting valve, breakage points, torque-limiting devices);	Pass.
	-avoiding fatigue in elements under variable stresses (notably cyclic stresses);	Pass.
	- static and dynamic balancing of rotating elements;	Pass.
	b) materials and their properties such as	-
	- resistance to corrosion, ageing, abrasion and wear;	Pass.

Clause	EN ISO 12100: 2010	Result
	- hardness, ductility, brittleness;	Pass. The materials have been treated by appropriate methods.
	- homogeneity;	Pass.
	- toxicity;	Pass. It is not toxicity.
	- flammability.	NA
	c) emission values for :	-
	- noise;	Pass. Noise is reduced by design and quality material.
	- vibration;	Pass. Vibration is reduced by handle materials and handles design.
	- hazardous substances;	Pass.
	- radiation.	NA
	When the reliability of particular components or assemblies is critical for safety (e.g. ropes, chains, lifting accessories for lifting loads or persons), stress values shall be multiplied by appropriate working coefficients.	Pass.
6.2.4	Choice of an appropriate technology	-
	One or more hazards can be eliminated or risks reduced by the choice of the technology to be used in certain applications, e.g. :	Pass
	a) on machines intended for use in explosive atmospheres: - fully pneumatic or hydraulic control system and machine actuators; - “intrinsically safe” electrical equipment (see IEC 60079-11)	NA
	b) for particular products to be processed such as a solvent: equipment assuring that the temperature will remain far below the flash point.	NA
	c) alternative equipment to avoid high noise level, e.g.:	Pass. The appropriate technology
	- electrical instead of pneumatic equipment - in certain conditions, water cutting instead of mechanical equipment.	NA
6.2.5	Applying the principle of the positive mechanical action	-
	Positive mechanical action is achieved when a moving mechanical component inevitably moves another component along with it, either by direct contact or via rigid elements. An example of this is positive opening operation of switching devices in an electrical circuit (see IEC 60947-5-1 and ISO 14119).	NA
6.2.6	Provisions for stability	-
	Machines shall be designed to have sufficient stability to allow them to be used safely in their specified conditions of use.	Pass. These machines have been designed to have adequate balance to allow operator use safely in their specified conditions of use.
	Factors to be taken into account include	-
	- geometry of the base;	Pass. The factor has been taken into account during design.
	- weight distribution, including loading;	Pass. The factor has been taken into account during design.

Clause	EN ISO 12100: 2010	Result
	- dynamic forces due to movements of parts of the machine, of the machine itself, or of elements held by the machine which may result in an overturning moment;	Pass. The factor has been taken into account during design.
	- vibration	Pass. The factor has been taken into account during design.
	- oscillations of the centre of gravity;	Not applicable
	- characteristics of the supporting surface in case of travelling or installation on different sites (e.g. ground conditions, slope);	Pass. The factor has been taken into account during design.
	- external forces (e.g. wind pressure, manual forces)	Pass. The factor has been taken into account during design.
	Stability shall be considered in all phases of the life of the machine, including handling, traveling, installation, use, de-commissioning and dismantling.	Pass. The factor has been taken into account during design.
	Other protective measures for stability relevant to safeguarding are given in 6.3.2.6	Pass. Please see the related clause.
6.2.7	Provision for maintainability	-
	When designing a machine, the following maintainability factors shall be taken into account:	-
	- accessibility, taking into account the environment and	Pass. These factors have been taken
	the human body measurements, including the dimensions of the working clothes and tools used;	into account during design.
	- ease of handling, taking into account human capabilities;	Pass. The factor has been taken into account during design.
	- limitation of the number of special tools and equipment;	Pass. The factor has been taken into account during design.
6.2.8	Observing ergonomic principles	-
	Ergonomic principles shall be taken into account in designing machinery to reduce mental or physical stress and strain of the operator.	Pass. Appropriate ergonomic principles have been taken into account in designing machinery to reduce mental or physical stress and strain of the operator.
	These principles shall be considered when allocating functions to operator and machine (degree of automation) in the basic design.	Pass. These principles have been taken into account during allocating functions to operator and machine.
	Account shall be taken of body sizes likely to be found in the intended user population, strengths and postures, movement amplitudes, frequency of cyclic actions (see ISO 10075 and ISO 10075-2)	Pass. All these factors have been taken into account during design.
	All elements of the “operator-machine” interface such as controls, signalling or data display elements, shall be designed to be easily understood so that clear and unambiguous interaction between the operator and the machine is possible.(see EN 614-1, ISO 6385, EN 13861 and IEC 61310-1)	Pass. All arrangement and design of Manual controls have been checked in compliance with.

Clause	EN ISO 12100: 2010	Result
	Designer's attention is especially drawn to following ergonomic aspects of machine design	-
	a) Avoiding stressful postures and movements during use of the machine (e.g. by providing facilities to adjust the machine to suit the various operators).	Pass. Stressful postures and movements during use of the machine have been avoided.
	b) Designing machines, and more especially hand-held and mobile machines to enable them to be operated easily taking into account human effort, actuation of controls and hand, arm and leg anatomy.	Pass. This machine has been adjusted to the human strength and convenient movement.
	c) Limit as far as possible noise, vibration and thermal effects such as extreme temperatures.	Pass. This machine has been designed with low noise, vibration.
	d) Avoid linking the operator's working rhythm to an automatic succession of cycles.	Pass. This situation has been avoided.
	e) Providing local lighting on or in the machine for the illumination of the working area and of adjusting, setting-up, and frequent maintenance zones when the design features of the machine and /or its guards render the ambient lighting inadequate. Flicker, dazzling, shadows and stroboscopic effects shall be avoided if they can cause a risk. If the position of the lighting source has to be adjusted, its location shall be such that it does not cause any risk to persons making the djustment.	Not applicable.
	f) Select, locate and identify manual controls (actuators) so that	-
	- they are clearly visible and identifiable and appropriately marked where necessary (see6.4.4)	Pass. All design and arrangement of the control logic have been checked in compliance with this requirement.
	- they can be safely operated without hesitation or loss of time and without ambiguity (e.g. a standard layout of controls reduces the possibility of error when an operator changes from a machine to another one of similar type having the same pattern of operation)	Pass. All design and arrangement of the control logic have been checked in compliance with this requirement.
	- their location(for push-buttons) and their movement (for levers and handwheels) are consistent with their effect (see IEC 61310-3)	Pass. All the function has been checked in compliance with this requirement.
	- their operation cannot cause additional risk	Pass.
	Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence (e.g. keyboards), the action to be performed shall be clearly displayed and subject to confirmation where necessary.	NA
	Controls shall be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles.	Pass. All the arrangement of the control logic have been checked in compliance with this requirement.
	Constraints due to the necessary or foreseeable use of personal protective equipment(such as footwear, gloves)shall be taken into account.	Not applicable.
	g) Select, design and locate indicators, dials and visual display units so that	-
	- they fit within the parameters and characteristics of human perception	Pass.

Clause	EN ISO 12100: 2010	Result
	- information displayed can be detected, identified and interpreted conveniently, i.e. long lasting, distinct,	Pass. All the information displayed comply with this requirement.
	unambiguous and understandable with respect to the operator's requirements and the intended use;	
	- the operator is able to perceive them form the control position	Pass.
6.2.9	Preventing electrical hazard	-
	For the design of the electrical equipment of machines IEC 60204-1 gives general provisions, especially in clause 6 for protection against electric shock.	NA
	For requirements related to specific machines, see corresponding IEC standards (e.g. series of IEC 61029, IEC 60745, IEC 60335).	NA
6.2.10	Preventing and hydraulic hazards	-
	Pneumatic and hydraulic equipment of machinery shall be designed so that :	-
	- the maximum rated pressure cannot be exceeded in the circuits (e.g. by means of pressure limiting devices)	NA
	- no hazard results from pressure surges or rises, pressure losses or drops or losses of vacuum;	NA
	- no hazardous fluid jet or sudden hazardous movement of the hose (whiplash)results from leakage or component failures;	NA
	- air receivers, air reservoirs or similar vessels (e.g. in gas loaded accumulators) comply with the design rules for these elements;	NA
	- air elements of the equipment, and especially pipes and hoses, be protected against harmful external effects;	NA
	- as far as possible, reservoirs and similar vessels (e.g. in gas loaded accumulators)are automatically depressurized when isolating the machine from its power supply (see 6.3.5.4) and, if it is not possible, means are provided for their isolation, local depressurizing and pressure indication (see also ISO 14118:2000, clause 5)	NA
	- all elements which remain under pressure after isolation of the machine from its power supply be provided with clearly identified exhaust devices, and a warning label drawing attention to the necessity of depressurizing those elements before any setting or maintenance activity on the machine. See also ISO 4413 and ISO 4414	NA
6.2.11	Applying inherently safe design measures to control system	-
6.2.11.1	General	-
	The design measures of the control system shall be chosen so that their safety-related performance provides	Pass. Inherently safe design
	a sufficient amount of risk reduction (see ISO 13849-1 or IEC 62061)	measures to control system have applied.
	The correct design of machine control systems can avoid unforeseen and potentially hazardous machine behaviour.	Pass. Inherently safe design measures to control system have applied.
	Typical causes of hazardous machine behavior are :	-
	- an unsuitable design or modification (accidental or deliberate) of the control system logic;	Pass.

Clause	EN ISO 12100: 2010	Result
	- a temporary or permanent defect or a failure of one or several components of the control system;	Pass.
	- a variation or a failure in the power supply of the control system;	Pass.
	- inappropriate selection, design and location of the control devices;	Pass.
	Typical examples of hazardous machine behaviour are:	-
	- unintended/unexpected start-up(see ISO 14118)	Pass.
	- uncontrolled speed change;	Pass.
	- failure to stop moving parts;	Pass.
	- dropping or ejection of a mobile part of the machine or of a workpiece clamped by the machine;	Pass.
	- machine action resulting from inhibition (defeating or failure) of protective devices	Pass.
	In order to prevent hazardous machine behaviour and to achieve safety functions, the design of control systems shall comply with the principles and methods presented in this subclause 6.2.11 and in 6.2.12.	Pass. the design of control systems comply with the related principles and methods
	These principles and methods shall be applied singly or in combination as appropriate to the circumstances (see ISO 13849-1 and IEC 60204-1and IEC 62061).	Pass. Please see the related clause.
	Control systems shall be designed to enable the operator to interact with the machine safely and easily; this requires one or several of the following solutions;	-
	- systematic analysis of start and stop conditions;	Pass. Systematic analysis have been applied.
	- provision for specific operating modes (e.g. start-up after normal stop, restart after cycle interruption or after emergency stop, removal of the workpieces contained in the machine, operation of a part of the machine in case of a failure of a machine element)	Pass. Enough provisions have been provided.
	- clear display of the faults;	Pass.
	- measures to prevent accidental generation of unexpected start commands (e.g. shrouded start device)	Pass. Main switch with lock and
	likely to cause dangerous machine behaviour (see ISO 14118:2000, figure 1)	related devices are provided.
	- maintained stop commands(e.g. interlock) to prevent restarting that could result in dangerous machine behaviour (see ISO 14118:2000, figure 1)	NA
	An assembly of machines may be divided into several zones for emergency stopping, for stopping as a result of protective devices and/or for isolation and energy dissipation.	NA
	The different zones shall be clearly defined and it shall be obvious which parts of the machine belong to which zone.	NA
	Likewise it shall be obvious which control devices (e.g. emergency stop devices, supply disconnecting devices)and/or protective devices belong to which zone.	NA
	The interfaces between zones shall be designed such that no function in one zone creates hazards in another zone which has been stopped for an intervention.	NA

Clause	EN ISO 12100: 2010	Result
	Control systems shall be designed to limit the movements of parts of the machinery, the machine itself, or workpieces and/or loads held by the machinery, to the safe design parameters(e.g. range, speed, acceleration, deceleration, load capacity). Allowance shall be made for dynamic effects (e.g. the swinging of loads).	NA
	For example:	-
	- the traveling speed of mobile pedestrian controlled machinery other than remote-controlled shall be compatible with walking speed.	NA
	- the range, speed, acceleration and deceleration of movements of the person-carrier and carrying vehicle for lifting persons shall be limited to non-hazardous values, taking into account the total reaction time of the operator and the machine.	NA
	- the range of movements of parts of machinery for lifting loads shall be kept within specified limits.	NA
	When machinery is designed to use synchronously different elements which can also be used independently the control system shall be designed to prevent risks due to lack of synchronization.	NA
6.2.11.2	Starting of internal power source/switching on an external power supply	-
	The starting of an internal power source or switching-on of an external power supply shall not result in a hazardous situation. For example:	NA
	_ starting the internal combustion engine shall not lead to movement of a mobile machine; _ connection to mains electricity supply shall not result in the starting of working parts of a machine. See IEC 60204-1:2005, 7.5 (see also Annexes A and B).	NA
6.2.11.3	Starting/stopping of a mechanism	-
	The primary action for starting or accelerating the movement of a mechanism should be performed by application or increase of voltage or fluid pressure, or, if binary logic elements are considered, by passage from state 0 to state 1(if state 1 represents the highest energy state)	NA
	The primary action for stopping or slowing down should be performed by removal or reduction of voltage or fluid pressure, or, if binary logic elements are considered, by passage from state 1 to state 0 (if state 1 represents the highest energy state).	Pass. The type of stopping of this machine belongs to state 1 and state 0.
	When, in order for the operator to maintain permanent control of deceleration, this principle is not observed (e.g. a hydraulic braking device of a self-propelled mobile machine), the machine shall be equipped with a means of slowing and stopping in case of failure of the main braking system	Pass. No such situation exist.
6.2.11.4	Restart after power interruption	-
	If it may generate a hazard, the spontaneous restart of a machine when it is re-energized after power interruption shall be prevented (e.g. by use of a self-maintained relay, contactor or valve).	Pass. The spontaneous restart of a machine when it is re-energized after power interruption has been prevented by contactor.
6.2.11.5	Interruption of power supply	-

Clause	EN ISO 12100: 2010	Result
	Machinery shall be designed to prevent hazardous situations resulting from interruption or excessive fluctuation of the power supply. At least the following requirements shall be met:	Pass. The hazardous situations resulting from interruption or excessive fluctuation of the power supply has been prevented.
	- the stopping function of the machinery shall remain;	Pass.
	- all devices whose permanent operation is required for safety shall operation an effective way to maintain safety (e.g. locking, clamping devices, cooling or heating devices, power-assisted steering of self-propelled mobile machinery);	Pass.
	- parts of machinery or workpieces and/or loads held by machinery which are liable to move as a result of potential energy shall be retained for the time necessary to allow them to be safely lowered.	Pass. No such situation exists.
6.2.11.6	Use of automatic monitoring	-
	Automatic monitoring is intended to ensure that a safety function(s) implemented by a protective measure do(es) not fail to be performed if the ability of a component or an element to perform its function is diminished, or if the process conditions are changed in such a way that hazards are generated.	Pass. Appropriate automatic monitoring has been used.
	Automatic monitoring either detects a fault immediately or carries out periodic checks so that a fault is detected before the next demand upon the safety function.	Pass. Appropriate automatic monitoring has been used.
	In either case, the protective measure can be initiated immediately or delayed until a specific event occurs (e.g. the beginning of the machine cycle.) The protective measures may be , e.g.:	Pass. Appropriate automatic monitoring has been used.
	- the stopping of the hazardous process;	Pass.
	- preventing the re-start of this process after the first stop following the failure;	Pass.
	- the triggering of an alarm	Pass.
6.2.11.7	Safety functions implemented by programmable electronic control systems	-
6.2.11.7.1	General	-
	A control system including programmable electronic equipment (e.g. programmable controllers) can be used to implement safety functions t machinery.	Pass. Such equipment is provided.
	Where a programmable electronic control system is used it is necessary to consider its performance requirements in relation to the requirements for the safety functions.	Pass.
	The design of the programmable electronic control system shall be such that the probability of random hardware failures and the likelihood of systematic failures that can adversely affect the performance of the safety-related control function(s) are sufficiently low.	Pass.
	Where a programmable electronic control system performs a monitoring function, the system behaviour on detection of a fault shall be considered (see also IEC 61508 series for further guidance)	NA
	The programmable electronic control system should be installed and validated to ensure that the specified performance (e.g. safety integrity level (SIL) in IEC 61508 series) for each safety function has been achieved.	NA

Clause	EN ISO 12100: 2010	Result
	Validation comprises testing an analysis (e.g. static, dynamic or failure analysis) to show that all parts interact correctly to perform the safety function and that unintended functions do not occur.	Pass. All parts interact correctly to perform the safety function and that unintended functions do not occur.
6.2.11.7.2	Hardware aspects	-
	The hardware (including e.g. sensors, actuators, logic solvers) shall be selected (and/or designed) and installed to meet both the functional and performance requirements of the safety function(s) to be performed, in particular, by means of :	Pass. The hardware has been selected and installed to meet both the functional and performance requirements of the safety functions to be performed.
	- architectural constraints (e.g. the configuration of the system, its ability to tolerate faults, its behaviour on detection of a fault);	Pass. Appropriate devices are provided.
	- selecting (and/or designing) equipment and devices with an appropriate probability of dangerous random hardware failure;	Pass. Appropriate devices are provided.
	-Incorporating measures and techniques within the hardware to avoid systematic failures and control systematic faults.	Pass. Appropriate devices are provided.
6.2.11.7.3	Software aspects	-
	The software (including internal operating software (or system software) and application software) shall be designed so as to satisfy the performance specification for the safety functions (see also IEC 61508-3)	NA
	Application software	NA
	Application software should not be re-programmable by the user.	NA
	This may be achieved by use of embedded software in a non re-programmable memory (e.g. micro-controller, application specific integrated circuit (ASIC)	NA
	When the application requires reprogramming by the user, the access o the software dealing with safety functions should be restricted e.g. by : - locks; - passwords for the authorized persons	NA
6.2.11.8	Principles relating to manual control	-
	a) Manual control devices shall be designed and located according to the relevant ergonomic principles given in 6.2.8	NA
	b) A stop control device shall be placed near each start control device. Where the start/stop function is performed by means of a hold-to-run control, a separate stop control device shall be provided when a risk can result from the hold-to-run control device failing to deliver a stop command when released.	NA
	c) Manual controls shall be located out of reach of the danger zones (see IEC 61310-3), except for certain controls where, of necessity, they are located within a danger zone, such as emergency stop or teach pendant.	NA
	d) Whenever possible, control devices and control positions shall be located so that the operator is able to	NA
	observe the working area or hazard zone.	
	The driver of a ride-on mobile machine shall be able to actuate all control devices required to operate the machine from the driving position, except for functions which can be controlled more safely from other positions.	NA

Clause	EN ISO 12100: 2010	Result
	On machinery intended for lifting persons, controls for lifting and lowering and, if appropriate, for moving the carrier, shall generally be located in the carrier. If safe operation requires controls to be situated outside the carrier, the operator in the carrier shall be provided with the means of preventing hazardous movements.	NA
	e) if it is possible to start the same hazardous element by means of several controls, the control circuit shall be so arranged that only one control is effective at a given time. This applies especially to machines which can be manually controlled by means among others of a portable control unit (teach pendant, for instance), with which the operator may enter danger zones.	NA
	f) Control actuators shall be designed or guarded so that their effect, where a risk is involved, cannot occur without intentional operation (see ISO 9355-1 and ISO 447)	NA
	g) For machine functions whose safe operation depends on permanent, direct control by the operator, measures shall be taken to ensure the presence of the operator at the control position , e.g. by the design and location of control devices.	NA
	h) For cableless control an automatic stop shall be performed when correct control signals are not received, including loss of communication (see IEC 60204-1)	NA
6.2.11.9	Control mode for setting, teaching, process changeover, fault-finding, cleaning or maintenance	-
	Where, for setting, teaching, process changeover, fault-finding, cleaning or maintenance of machinery, a guard has to displaced or removed and/or a protective device has to be disabled, and where it is necessary for the purpose of these operations for the machinery or part of the machinery to be put in operation, safety of the operator shall be achieved using a specific control mode which simultaneously:	NA
	- disables all other control modes;	NA
	- permits operation of the hazardous elements only by continuous actuation of an enabling device, a hold-to-run control device or a two-hand control device;	NA
	- permits operation of the hazardous elements only in reduced risk conditions (e.g. reduced speed, reduced power/force, step-by-step operation, e.g. with a limited movement control device)	NA
	prevents any operation of hazardous functions by voluntary or involuntary action on the machine's sensors.	NA
	This control mode shall be associated with one or more of following measures:	NA
	- restriction of access to the danger zone as far as possible.	NA
	- emergency stop control within immediate reach of the operator;	NA
	- portable control unit (teach pendant) and/or local controls allowing sight of the controlled elements. (see IEC 60204-1:1997, 9.2.4)	NA
6.2.11.10	Selection of control and operating modes	-

Clause	EN ISO 12100: 2010	Result
	If machinery has been designed and built to allow for its use in several control or operating modes requiring different protective measures and/or work procedures (e.g. to allow for adjustment , setting, maintenance, inspection), it shall be fitted with a mode selector which can be locked in each position.	NA
	Each position of the selector shall be clearly identifiable and shall exclusively allow one control or operating mode.	NA
	The selector may be replaced by another selection means which restricts the use of certain functions of the machinery to certain categories of operators (e.g. access codes for certain numerically controlled functions).	NA
6.2.11.11	Applying measures achieve electromagnetic compatibility (EMC)	-
	For guidance on electromagnetic compatibility, see IEC 60204-1, and IEC 61000-6 series.	Pass. Please see the related clause.
6.2.11.12	Provision of diagnostic systems to aid fault-finding	-
	Diagnostic systems to aid fault finding should be included in the control system so that there is no need to disable any protective measures.	Pass. Diagnostic systems are provided.
6.2.12	Minimizing the probability of failure of safety functions	-
6.2.12.1	General	
	Safety of machinery is not only dependent on the reliability of the control systems but also on the reliability of all parts of the machine. The continued operation of the safety functions is essential for the safe use of the machine. This can be achieved by :	- Pass.
6.2.12.2	Use of reliable components	-
	“Reliable components” means components which are capable of withstanding all disturbances and stresses associated with the usage of the equipment in the conditions of intended use (including the environmental conditions), for the period of time or the number of operations fixed for the use, with a low probability of failures generating a hazardous malfunctioning of the machine. Components shall be selected taking into account all factors mentioned above(see also 6.213)	Pass. Reliable components have been used.
6.2.12.3	Use of “oriented failure mode” components	-
	“Oriented failure mode” components or systems are those in which the predominant failure mode is known in advance and which can be used so that such a failure leads to a non-hazardous alteration of the machine function.	NA
	The use of such components should always be considered, particularly in cases where redundancy is (see 6.2.12.4) not employed.	NA
6.2.12.4	Duplication (or redundancy) of components or subsystems	-
	In the design of safety-related parts of the machine, duplication (or redundancy) of components may be used so that, if one component fails, another component (or other components) continue(s) to perform its (their) function, thereby ensuring that the safety function remains available.	NA

Clause	EN ISO 12100: 2010	Result
	In order to allow the proper action to be initiated, component failure shall be preferably detected by automatic monitoring (see 6.2.11.6) or in some circumstances by regular inspection,	NA
	provided that the inspection interval is shorter than the expected lifetime of the components.	NA
	Diversity of design and/or technology can be used to avoid common cause failures (e.g. from electromagnetic disturbance) or common mode failures.	NA
6.2.13	Limiting exposure to hazards through reliability of equipment	-
	Increased reliability of all component parts of machinery reduces the frequency of incidents requiring rectification, thereby reducing exposure to hazards.	Pass. This requirement is complied with.
	This applies to power systems (operative part) as well as to control systems, to safety functions as well as to other functions of machinery.	Pass. This requirement is complied with.
	Safety-critical components (as e.g. certain sensors) with a known reliability shall be used.	Pass. Safety-critical components are used in this machine.
	The elements of guards and of protective services shall be particularly reliable, as their failure can expose persons to hazards, and also as poor reliability would encourage attempts to defeat them.	Pass. This requirement is complied with.
6.2.14	Limiting exposure to hazards through mechanization or automation of loading(feeding) /unloading (removal) operations	-
	Mechanization and automation of machine loading/unloading operations and more generally of handling operations (of workpieces, materials, substances) limit the risk generated by these operations by reducing the exposure of persons to hazards at the operating points.	Pass. This requirement is complied with.
	Automation can be achieved e.g. by robots, handling devices, transfer mechanisms, air blast equipment.	Pass. This requirement has been complied with by design.
	Mechanization can be achieved, e.g. by feeding slides, push rods, hand-operated indexing tables.	Pass. This requirement has been complied with by design.
	While automatic feeding and removal devices have much to offer in preventing accidents to machine operators, they can create danger when any faults are being rectified.	Pass. Appropriate provisions have been provided.
	Care shall be taken to ensure that the use of these devices does not introduce further hazards (e.g. trapping, crushing) between the devices and parts of the machine or workpieces/materials being processed.	Pass. These devices will not introduce further hazards
	Suitable safeguards (see 6.3) shall be provided if this cannot be ensured.	Pass. Please see the related clause.
	Automatic feeding and removal devices with their own control systems and the control systems of the associated machine shall be interconnected after thoroughly studying how all safety functions are performed in all control and operation modes of the whole equipment.	Pass. This requirement has been complied with by design.
6.2.15	Limiting exposure to hazards through location of the setting and maintenance points outside of danger zones.	Pass.

Clause	EN ISO 12100: 2010	Result
	The need for access to danger zones shall be minimized by locating maintenance, lubrication and setting points outside these zones.	Pass.
6.3	Safeguarding and complementary protective measures	-
6.3.1	General	-
	Guards and protective devices shall be used to protect persons whenever inherently safe design does not reasonably make it possible either to remove hazards or to sufficiently reduce risks. Complementary protective measures involving additional equipment (e.g. emergency stop equipment)may have to be implemented.	Pass.
	The different kinds of guards and protective devices are defined in 3.27 and 3.28.	Pass. Please see the related clause.
	Certain safeguards may be used to avoid exposure to more than one hazard (e.g. a fixed guard preventing access to a zone where a mechanical hazard is present being used to reduce noise level and collect toxic emissions)	Pass. Such safeguards exist.
6.3.2	Selection and implementation of guards and protective devices	-
6.3.2.1	General	-
	This subclause gives guidelines for the selection and the implementation of guards and protective devices the primary purpose of which is to protect persons against hazard generated by moving parts, according to the nature of those parts (see figure 4) and to the need for	Pass. Please see the related clause.
	access to the danger zone(s).	
	The exact choice of a safeguard for a particular machine shall be made on the basis of the risk assessment for that machine.	Pass.
	In selecting an appropriate safeguard for a particular type of machinery or hazard zone, it shall be borne in mind that a fixed guard is simple and shall be used where access of an operator to the danger zone is not required during normal operation (operation without any malfunction) of the machinery.	Pass.
	As the need for frequency of access increase this inevitably leads to the fixed guard not being replaced .	Pass. This requirement is complied with.
	This requires the use of an alternative protective measure (movable interlocking guard, sensitive protective equipment.)	Pass.
	A combination of safeguards may sometimes be required. For example , where, in conjunction with a fixed guard, a mechanical loading (feeding) device is used to feed a workpiece into a machine, thereby removing the need for access to the primary hazard zone, a trip device may be required to protect against the secondary drawing-in or shearing hazard between the mechanical loading (feeding) device, when reachable, and the fixed guard.	NA
	Consideration shall be given to the enclosure of control positions or intervention zones to provide combined protection against several hazards which may include:	Pass. This requirement has been taken in to consideration.
	- hazards from falling or ejected objects (e.g. falling object protection structure)	Pass. No such hazards exist in this machine.

Clause	EN ISO 12100: 2010	Result
	- emission hazards (e.g. protection against noise, vibration, radiation , harmful substances)	Pass. No such hazards exist in this machine.
	- hazards due to the environment (e.g. protection against heat, cold, foul weather)	Pass.
	- hazards due to tipping over or rolling over of machinery (e.g. roll-over or tip-over protection structure)	Pass. No such hazards exist in this machine.
	The design of such enclosed work stations (e.g. cabs and cabins) shall take into account ergonomic principles concerning visibility, lighting, atmospheric conditions, access, posture.	Pass. Ergonomic principles have been taken into account during design.
6.3.2.2	Where access to the hazard zone is not required during normal operation	-
	Where access to the hazard zone is not required during normal operation of the machinery, safeguard should be selected from the following:	-
	a) fixed guard (see also ISO 14120)	Pass. Fixed guards are provided.
	b) interlocking guard with or without guard locking (see also 6.3.3.2.3, ISO 14119, ISO 14120);	Pass. Interlocking guards are
		provided.
	c) self-closing guard (see ISO 14120:2002, 3.3.2)	NA
	d) sensitive protective equipment, e.g. electro-sensitive protective equipment (see IEC 61496) or pressure sensitive mat (see ISO 13856)	NA
6.3.2.3	Where access to the hazard zone is required during normal operation	-
	Where access to the hazard zone is required during normal operation of the machinery , safeguards should be selected from the following:	-
	a) interlocking guard with or without guard locking (see also ISO 14119, ISO 14120 and 6.3.3.2.3 of this standard);	NA
	b) sensitive protective equipment, e.g electro-sensitive protective equipment (see IEC 61496)	NA
	c) adjustable guard;	NA
	d) self-closing guard (see ISO 14120:2002, 3.3.2)	NA
	e) two-hand control device (see ISO 13851)	NA
	f) interlocking guard with a start function (control guard) (see 6.3.3.2.5 of this standard)	NA
6.3.2.4	Where access to the hazard zone is required for machine setting, teaching, process changeover, fault finding, cleaning or maintenance.	-
	As far as possible, machines shall be designed so that the safeguards provided for the protection of the production operator may ensure also the protection of personnel in charge of setting, teaching, process changeover, fault finding, cleaning or maintenance without hindering them in performing their task.	NA
	Such tasks shall be identified and considered in the risk assessment as parts of the use of the machine (see 5.2)	NA
6.3.2.5	Selection and implementation of sensitive protective equipment	-
6.3.2.5.1	Selection	-
	Due to the great diversity of the technologies on which their detection function is based, all types of sensitive protective equipment are far from being equally suitable for safety applications.	NA

Clause	EN ISO 12100: 2010	Result
	The following provisions are intended to provide the designer with criteria for selecting , for each application , the most suitable device(s).	NA
	Types of sensitive protective equipment include, e.g.:	-
	- light curtains;	NA
	- scanning devices as, e.g. laser scanners;	NA
	- pressure sensitive mats;	NA
	- trip bars, trip wires.	NA
	Sensitive protective equipment can be used:	-
	- for tripping purposes;	NA
	- for presence sensing;	NA
	- for both tripping and presence sensing	NA
	- to re-initiate machine operation, a practice which is subject to stringent conditions.	NA
	The following characteristics of the machinery, among others, can preclude the sole use of sensitive protective equipment:	-
	- tendency for the machinery to eject materials or component parts;	NA
	- necessity to guard against emissions (noise, radiation, dust, etc.)	NA
	- erratic or excessive machine stopping time;	NA
	- inability of a machine to stop part-way through a cycle.	NA
6.3.2.5.2	Implementation	-
	consideration should be given to :	-
	a) - size, characteristics and positioning of the detection zone (see ISO 13855, which deals with the positioning of some types of sensitive protective equipment)	NA
	b) - reaction of the device to fault conditions (see IEC 61496for electro-sensitive protective equipment)	NA
	c)- possibility of circumvention	NA
	d)- detection capability and its variation over the course of time (e.g. as a result of its susceptibility to different environmental conditions such as the presence of reflecting surfaces, other artificial light sources, sunlight or impurities in the air.	NA
	sensitive protective equipment shall be integrated in the operative part and associated with the control system of the machine so that:	NA
	- a command is given as soon as a person or part of a person is detected;	NA
	- the withdrawal of the person or part of a person detected does not, by itself, restart the hazardous machine function (s); therefore, the command given by the sensitive protective equipment shall be maintained by the control system until a new command is given;	NA
	- restarting the hazardous machine function(s) results from the voluntary actuation , by the operator, of a control device placed outside the hazard zone, where this zone can be observed by the operator;	NA
	- he machine cannot operate during interruption of the detection function of the sensitive protective equipment, except during muting phases,;	NA

Clause	EN ISO 12100: 2010	Result
	- the position and the shape of detection field prevents, ,possibly together with fixed guards, a person or part of a person from entering the hazard zone, or being present in it, without being detected.	NA
6.3.2.5.3	Additional requirements for sensitive protective equipment when used for cycle initiation.	-
	In this exceptional application, starting of the machine cycle is initiated by the withdrawal of a person or of the detected part of a person from the sensing field of the sensitive protective equipment, without any additional start command, hence deviating from the general requirement given in the second point of the dashed list in 6.3.2.5.2, above. After switching on the power supply, or when the machine has been stopped by the tripping function of the sensitive protective equipment, the machine cycle shall be initiated only by voluntary actuation of a start control.	NA
	Cycle initiation by sensitive protective equipment shall be subject to the following conditions:	
	a) only active optoelectronic protective devices (AOPDs) complying with IEC 61496 series shall be used;	NA
	b) the requirements for an AOPD used as a tripping and presence-sensing device (see IEC 61496) are satisfied — in particular, location, minimum distance (see ISO 13855), detection capability, reliability and monitoring of control and braking systems;	NA
	c) the cycle time of the machine is short and the facility to re-initiate the machine upon clearing of the sensing field is limited to a period commensurate with a single normal cycle;	NA
	d) entering the sensing field of the AOPD(s) or opening interlocking guards is the only way to enter the hazard zone;	NA
	e) if there is more than one AOPD safeguarding the machine, only one of the AOPD（s） is capable of cycle re-initiation;	NA
	f) with regard to the higher risk resulting from automatic cycle initiation, the AOPD and the associated control system comply with a higher safety-related performance than under normal conditions.	NA
6.3.2.6	Protective measures for stability	-
	If stability cannot be achieved by inherently safe design measures such as weight distribution (see 4.6), it will be necessary to maintain it by protective measures such as the use of :	-
	- anchorage bolts;	Pass. Anchorage bolts have been used.
	- locking devices;	NA
	- movement limiters or mechanical stops;	NA
	- acceleration or deceleration limiters;	NA
	- load limiters;	NA
	- alarms warning of the approach to stability or tipping limits;	NA
6.3.2.7	Other protective devices	-

Clause	EN ISO 12100: 2010	Result
	When a machine requires continuous control by the operator(e.g. mobile machines, cranes) and an error of the operator can generate a hazardous situation, this machine shall be equipped with the necessary devices to enable the operation to remain within specified limits , in particular:	NA
	- when the operator has insufficient visibility of the hazard zone;	NA
	- when the operator lacks knowledge of the actual value of a safety –related parameter (e.g. .a distance, a speed, the mass of a load, the angle of a slope)	NA
	- when hazards may result from operations other than those controlled by the operator;	NA
	The necessary devices include:	-
	- devices for limiting parameters of movement (distance, angle, velocity , acceleration)	NA
	- overloading and moment limiting devices:	NA
	- devices to prevent collisions or interference with other machines;	NA
	-device for preventing hazards to pedestrian operators of mobile machinery or other pedestrians;	NA
	- torque limiting devices, breakage points to prevent excessive stress of components and assemblies;	NA
	- devices for limiting pressure, temperature;	NA
	- devices for monitoring emissions;	NA
	- devices prevent operation in the absence of the operator at the control position;	NA
	- device to prevent lifting operations unless stabilizers are in place;	NA
	- devices to limit inclination of the machine on a slope;	NA
	- devices to ensure that components are in a safe position before traveling;	NA
	Automatic protective measures triggered by such devices which take operation of the machinery out of the control of the operator (e.g. automatic stop of hazardous movement) should be preceded or accompanied by a warning signal to enable the operator to take appropriate action (see 6.4.3)	NA
6.3.3	Requirements for the design of guards and protective devices	-
6.3.3.1	General requirements	-
	Guards and protective devices shall be designed to be suitable for the intended use, taking into account mechanical and other hazards involved. Guards and protective devices shall be compatible with the working environment of the machine and designed so that they cannot be easily defeated. They shall provide the minimum possible interference with activities during operation and other phases of machine life, in order to reduce any incentive to defeat them.	Pass. Guards and protective devices have been appropriately designed.
	Guards and protective devices shall :	-
	- be of robust construction.	Pass. This requirement has been taken into account during design.
	- not give rise to any additional hazard;	Pass. This requirement has been taken into account during design.

Clause	EN ISO 12100: 2010	Result
	- not be easy to by-pass or render non-operational;	Pass. This requirement has been taken into account during design.
	- be located at an adequate distance from the danger zone (see ISO 13857 and ISO 13855).	Pass. This requirement has been taken into account during design.
	- cause minimum obstruction to the view of the production process;	Pass. This requirement has been taken into account during design.
	- enable essential work to be carried out on installation and/or replacement of tools and also for maintenance by allowing access only to the area where the work has to be done, if possible without the guard or protective device having to be moved;	Pass. This requirement has been taken into account during design.
	For openings in the guards see ISO 13857	Pass. This requirement has been taken into account during design.
6.3.3.2	Requirements for fixed guards	-
6.3.3.2.1	Functions of guards	-
	The functions that guards can achieve are:	-
	-prevention of access to the space enclosed by guard and/or -containment/capture of materials, workpieces, chips, liquids which may be ejected or dropped by the machine and reduction of emissions(noise, radiation, hazardous substances such as dust, fumes, gases) which may be generated by the machine.	Pass These functions are achieved by fixed guards.
	Additionally, they may need to have particular propertied relating to electricity, temperature, fire, explosion, vibration, visibility(see ISO 14120) and operator position ergonomics(e.g. usability, operator's movements, posture, repetitive movements).	Pass These functions are achieved by fixed guards.
6.3.3.2.2	Requirements for fixed guards	-
	Fixed guards shall be securely held in place:	-
	- either permanently (e.g. by welding) - or by means of fasteners (screws, nuts) making removal/opening	Pass All the fixed guards are securely held in place by
	impossible without using tools; they should not remain closed without their fasteners (see ISO 14120)	Appropriate fasteners.
6.3.3.2.3	Requirements for movable guards	-
	a) movable guards which provide protection against hazards generated by moving transmission parts shall :	-
	- as far as possible remain fixed to the machinery or other structure (generally by means of hinges or guides) when open;	Pass. Gaels are used for the movable guards.
	- be interlocking guards (with guard locking when necessary) (see ISO 14119)	Pass Interlock switches are used.
	b) movable guards against hazards generated by non-transmission moving parts shall be designed and associated with the machine control system so that:	-
	- moving parts cannot start up while they are within the operator's reach and the operator cannot reach moving parts once they have started up ; this can be achieved by interlocking guards, with guard locking when necessary.	Pass. Interlocking guards are provided to comply with these requirements.
	- they can be adjusted only by an intentional action , such as the use of a tool or a key;	Pass. This requirement is complied with.
	- the absence or failure of one of their components prevents starting of the moving parts or stops them; this can be achieved by automatic monitoring (see 4.11.6)	Pass. This requirement is complied with.

Clause	EN ISO 12100: 2010	Result
6.3.3.2.4	Requirements for adjustable guards	-
	Adjustable guards may only be used where the hazard zone cannot for operational reasons be completely enclosed;	NA
	They shall :	-
	- be designed so that the adjustment remains fixed during a given operation;	NA
	- be readily adjustable without the use of tools;	NA
6.3.3.2.5	Requirements for interlocking guards with a start function (control guards)	-
	An interlocking guard with a start function may be used provided that	-
	- all requirements for interlocking guards are satisfied (see ISO 14119)	NA
	- the cycle time of the machine is short	NA
	- the maximum opening time of the guard is present to a low value (e.g. equal to the cycle time). When this time is exceeded, the hazardous function(s) cannot be initiated by the closing of the interlocking guard with a start function and resetting is necessary before restarting the machine.	NA
	- the dimensions or shape of the machine do not allow a person, or part of a person, to stay in the hazard zone or between the hazard zone and the guard while the guard is closed (see ISO 14120)	NA
	- all other guards whether fixed (removable type) or movable are interlocking guards;	NA
	- the interlocking device associated with the interlocking guard with a start function is designed in such a way – e.g. by duplication of position detectors and use of automatic monitoring (see 4.11.6)- that its failure cannot lead to an unintended/unexpected start-up;	NA
	- the guard is securely held open (e.g. by a spring or counterweight)such that it cannot initiate a start while falling by its own weight;	NA
6.3.3.2.6	Hazards from guards	-
	Care shall be taken to prevent hazards which might be generated by :	-
	- the guard construction (e.g. sharp edges or corners, material);	Pass. No such hazards exist in this machine.
	- the movements of the guards (shearing or crushing zones generated by power-operated guards and by heavy guards which are liable to fall)	Pass. No such hazards exist in this machine.
6.3.3.3	Technical characteristics of protective devices	-
	Protective devices shall be selected or designed and connected to the control system so as to ensure correct implementation of their safety function (s) is ensured.	Pass. This requirement has been taken into account during design.
	Protective devices shall be selected on the basis of their having met the appropriate product standard (for example, IEC 61496 for active optoelectronic protective devices) or shall be designed according to one or several of the principles formulated in ISO 13849-1 or IEC 62061.	Pass. This requirement has been taken into account during design.
	Protective devices shall be installed and connected to the control system so that they cannot be easily defeated.	Pass. This requirement has been taken into account during design.
6.3.3.4	Provisions for alternative types of safeguards.	-

Clause	EN ISO 12100: 2010	Result
	Provisions should be made to facilitate the fitting of alternative types of safeguards on machinery where it s known that this fitting will be necessary because the work to be done on it will vary.	NA
6.3.4	Safeguarding for reducing emissions	-
6.3.4.1	General	-
	If the measures for the reduction of emissions at source mentioned in 6.2.2.2 are not adequate, the machine shall be provided with additional protective measures (see 6.3.4.2 to 6.3.4.5).	Pass. No such hazard exists.
6.3.4.2	Noise	-
	Additional protective measures include, for example: - enclosures (see ISO 15667) - screens fitted to the machine; - silencers (see ISO 14163)	Pass.
6.3.4.3	Vibration	-
	Additional protective measures include, for example, damping devices for vibration isolation between the source and the exposed person such as resilient mounting or suspended seats.	Pass.
	For measures for vibration isolation of stationary industrial machinery see EN 1299	Pass. No such hazard exists.
6.3.4.4	Hazardous substances	-
	Additional protective measures include, for example:	-
	- encapsulation of the machine (enclosure with negative pressure);	NA
	- local exhaust ventilation with filtration.	NA
	- wetting with liquids;	NA
	- special ventilation in the area of the machine (air curtains , cabins for operators)	NA
6.3.4.5	Radiation	-
	Additional protective measures include, for example:	-
	- use of filtering and absorption;	NA
	- use of attenuating screens or guards	NA
6.3.5	Complementary protective measures	-
6.3.5.1	General	-
	Protective measures which are neither inherently safe design measures, nor safeguarding (implementation of guards and/or protective devices), nor information for use may have to be implemented as required by the intended use and the reasonably foreseeable misuse of the machine.Such measures include, but are not limited to , the ones dealt with in 6.3.5.2 to 6.3.5.6	Pass. -
6.3.5.2	Components and elements to achieve the emergency stop function	-
	If following a risk assessment, a machine needs to be fitted with components and elements to achieve an emergency stop function to enable actual or impending emergency situations to be averted, the following requirements apply:	-
	- the actuators shall be clearly identifiable, clearly visible and readily accessible	Pass. The actuators can be clearly identifiable, clearly visible and readily accessible
	- the hazardous process shall be stopped as quickly as possible without creating additional hazards . If this is not possible or the risk cannot be reduced, it should be questioned whether implementation of an emergency stop function is the best solution;	Pass. The hazardous process can be stopped as quickly as possible without creating additional hazards

Clause	EN ISO 12100: 2010	Result
	- the emergency stop control shall trigger or permit the triggering of certain safeguard movements where necessary.	Pass No this situation exists.
	Once active operation of the emergency stop device has ceased following an emergency stop command, the effect of this command shall be sustained until it is reset.	Pass. Reset is necessary before re-start.
	This reset shall be possible only at that location where the emergency stop command has been initiated. The reset of the device shall not restart the machinery , but only permit restarting.	Pass. This requirement is complied with by appropriate design of the emergency stop.
	More details for the design and selection of electrical components and elements to achieve the emergency stop function are provided in IEC 60204 series.	Pass. Please see the related clauses.
6.3.5.3	Measures for the escape and rescue of trapped persons	-
	Measures for the escape and rescue of trapped persons may consist e.g. of :	-
	- escape routes and shelters in installations generating operator-trapping hazards'	NA
	- arrangements for moving some elements by hand, after an emergency stop	NA
	- arrangements for reversing the movement of some elements	NA
	- anchorage points for descender devices;	NA
	- means of communication to enable trapped operators to call for help	NA
6.3.5.4	Measures for isolation and energy dissipation	-
	Especially with regard to their maintenance and repair , machines shall be equipped with the technical means to achieve the isolation from power supply(ies) and dissipation of stored energy as a result of following actions:	-
	a) isolating (disconnecting, separating) the machine (or defined parts of the machine) from all power supplies;	Pass.
	b) locking (or otherwise securing) all the isolating units in the isolating position;	Pass.
	c) dissipating or , if this is not possible or practicable, restraining (containing) any stored energy which may give rise to a hazard;	Pass.
	d) verifying, by means of a safe working procedure, that the actions taken according to a), b) and c) above have produced the desired effect.	Pass.
	See ISO 14118:2000, clause 5 and IEC 60204-1:2005, 5.5 and 5.6	
6.3.5.5	Provisions for easy and safe handling of machines and their heavy component parts	-
	Machines and their component parts which cannot be moved or transported by hand shall be provided or capable of being provided with suitable attachment devices for transport by means of lifting gear.	Pass. Appropriate attachments are provided.
	These attachments may be, among others,	-
	- standardized lifting appliances with slings, hooks, eyebolts, or tapped holes for appliance fixing;	Pass. Such devices are used.
	- appliances for automatic grabbing with a lifting hook when attachment is not possible from the ground.	NA
	- guiding grooves for machines to be transported by a fork truck;	Pass. Such devices are used.
	- lifting gear and appliances integrated into the machine.	NA

Clause	EN ISO 12100: 2010	Result
	Parts of machinery which can be removed manually in operation shall be provided with means for their safe removal and replacement; See also 6.4.4c)（ item 3).	Pass
6.3.5.6	Measures for safe access to machinery	-
	Machinery shall be so designed as to enable operation and all routine tasks relating to setting and/or maintenance, to be carried out, as far as possible, by a person remaining at ground level.	Pass. These requirements have been taken into account during design.
	Where this is not possible, machines shall have built-in platforms, stairs or other facilities to provide safe access for those tasks, but care should be taken to ensure that such platforms or stairs do not give access to danger zones of machinery.	NA
	The walking areas shall be made from materials which remain as slip resistant as practicable under working conditions and, depending on the height from the ground, suitable guard-rails (see ISO 14122-3) shall be provided.	NA
	In large automated installations, particular attention shall be given to safe means of access such as walkways, conveyor bridges or crossover points.	NA
	Means of access to parts of machinery located at a height shall be provided with collective means of protection against falls (e.g. guard-rails for stairways, stepladders and platforms and/or safety cages for ladders)	NA
	As necessary , anchorage points for personal protective equipment against falls from a height shall also be provided (e.g. in carriers of machinery for lifting persons or with elevating control sations)	NA
	Openings shall whenever possible open towards a safe position. They shall be designed to prevent hazards due to unintended opening.	NA
	The necessary aids for access shall be provided (e.g. steps, handholds). Control devices shall be designed and located to prevent their being used as aids for access.	NA
	When machinery for lifting goods and/or persons includes landings at fixed levels, these shall be equipped with interlocking guards preventing falls when the platform is not present at the level.	NA
	Movement of the lifting platform shall be prevented while the guards are open.	NA
	For detailed provisions see ISO 14122.	NA
6.4	Information for use	
6.4.1	General requirements	-
	Drafting information for use is an integral part of the design of a machine (see figure 2).	Pass. Please see the related clause.
	Information of use consists of communication links, such as texts, words, signs, signals, symbols or diagrams, used separately or in combination to convey information to the user. It is directed to professional and/or non-professional users.	Pass. All the information is stated in the appropriate place.
6.4.1.2	Information shall be provided to the user about the intended use of the machine, taking into account, notably, all its operating modes.	-

Clause	EN ISO 12100: 2010	Result
	The information shall contain all directions required to ensure safe and correct use of the machine. With this in view, it shall inform and warn the user about residual risk.	Pass. All the information is stated in the appropriate place.
	The information shall indicate, as appropriate,	-
	- the need for training,	Pass. All the information is stated in the appropriate place.
	- the need for personal protective equipment,	Pass. All the information is stated in the instruction manual.
	- the possible need for additional guards or protective devices (see Figure 2, Footnote d).	Pass. All the information is stated in the appropriate place.
	It shall not exclude uses of the machine that can reasonably be expected from its designation and description and shall also warn about the risk which would result from using the machine in other ways than the ones described in the information, especially considering its reasonably foreseeable misuse.	Pass. All the information is stated in the appropriate place.
6.4.1.3	Information for use shall cover, separately or in combination, transport, assembly and installation, commissioning, use of the machine (setting, teaching/programming or process changeover, operation, cleaning, fault-finding and maintenance) and, if necessary, dismantling, disabling and scrapping.	Pass. All the information is stated in the appropriate place.
6.4.2	Location and nature of the information for use	-
	Depending on the risk , the time when the information is needed by the user and the machine design , it shall be decided whether the information – or parts thereof – are to be given:	Pass. All the information is stated in the appropriate place.
	- in /on the machine itself (see 6.3 and 6.4.4)	Pass. Adequate information is stated in the machine itself.
	- in accompanying documents (in particular instruction handbook , see 6.4.5)	Pass. Adequate information is stated in the accompanying documents
	- on the packaging	Pass. Adequate information is stated on the packaging
	- by other means such as signals and warnings outside the machine.	Pass. Adequate information is stated
	Standardized phrases shall be considered where important messages such as warnings need to be given (see also IEC 62079)	Pass. This requirement is considered.
6.4.3	Signals and warning devices	-
	Visual signals (e.g. flashing lights) and audible signals (e.g. sirens) may be used to warn of an impending hazardous event such as machine start-up or overspeed.	Pass. Signals and warning devices are provided.
	Such signals may also be used to warn the operator before the triggering of automatic protective measures (see last paragraph of 5.2.70	Pass. Please the related clause.
	It is essential that these signals:	-
	- be emitted before the occurrence of the hazardous event;	Pass. This requirement is taken into account during design and selection of the warning devices.
	- be unambiguous;	Pass. This requirement is taken into account during design and selection of the warning devices.

Clause	EN ISO 12100: 2010	Result
	- be clearly perceived and differentiated from all other signals used;	Pass. This requirement is taken into account during design and selection of the warning devices.
	- be clearly recognized by the operator and other persons.	Pass. This requirement is taken into account during design and selection of the warning devices.
	The warning devices shall be designed and located such that checking is easy.	Pass. This requirement is taken into account during design and location of the warning devices.
	The information for use shall prescribe regular checking of warning devices.	Pass. All the related information is stated in the manual.
	The attention of designers is drawn to the risks from “sensorial saturation” which results from too many visual and/or acoustic signals, which may also lead to defeating the warning devices.	-
6.4.4	Markings, signs (pictograms), written warnings	-
	Machinery shall bear all markings which are necessary:	-
	a) for its unambiguous identification, at least :	-
	- name and address of the manufacturer;	Pass. Adequate information is provided.
	- designation of series or type;	Pass. Adequate information is provided.
	- serial number, if any.	Pass. Adequate information is
		provided.
	b) in order to indicate its compliance with mandatory requirements;	-
	- marking;	Pass. Adequate marking is provided.
	- written indications (e.g. for machines intended for use in potentially explosive atmosphere)	Pass. Adequate information is provided.
	c) for its safe use, e.g. :	-
	- maximum speed of rotating parts;	Pass. Adequate information is provided.
	- maximum diameter of tools;	Pass. Adequate information is provided.
	- mass (expressed in kilograms) of the machine itself and/or of removable parts’	Pass. Adequate information is provided.
	- maximum working load;	Pass. Adequate information is provided.
	- necessity of wearing personal protective equipment;	Pass. Adequate information is provided.
	- guard adjustment data;	Pass. Adequate information is provided.
	- frequency of inspection.	Pass. Adequate information is provided.
	Information printed directly on the machine should be permanent and remain legible throughout the expected life of the machine.	Pass. This requirement is complied with e metal plate.
	Signs or written warnings only saying “danger” shall not be used.	NA

Clause	EN ISO 12100: 2010	Result
	Markings, signs and written warnings shall be readily understandable and unambiguous, especially as regards the part of the function(s) of the machine which they are related to.	Pass. Sign and pictograms are used.
	Readily understandable signs (pictograms) should be used in preference to written warnings.	Pass. Sign and pictograms are used.
	Signs and pictograms should only be used if they are understood in the culture in which the machinery is to be used.	Pass. Sign and pictograms are used according to relevant standard.
	Markings shall comply with recognized standards (see ISO 2972, ISO 7000, particularly for pictograms, symbols , colours) See IEC 60204 series as regards marking of electrical equipment.	Pass. All the markings are standard.
6.4.5	Accompanying documents (in particular, instruction handbook)	-
6.4.5.1	Contents	-
	The instruction handbook or other written instructions (e.g. on the packaging) shall contain among others:	-
	a) information relating to transport, handling and storage of the machine e.g. :	Pass All the related information is stated in the instruction handbook
	- storage conditions for the machine;	Pass. All the related information is stated in the instruction handbook
	- dimensions , mass value(s), position of the centre (s) of gravity;	Pass. All the related information is stated in the instruction handbook
	- indications for handling (e.g. drawings indicating application points for lifting equipment)	Pass. All the related information is stated in the instruction handbook
	b) information relating to installation and commissioning of the machine, e.g.	-
	- fixing/anchoring and vibration dampening requirements;	Pass. All the related information is stated in the instruction handbook
	- assembly and mounting conditions;	Pass. All the related information is stated in the instruction handbook
	- space needed for use and maintenance;	Pass. All the related information is stated in the instruction handbook
	- permissible environmental conditions (e.g. temperature, moisture, vibration, electromagnetic radiation);	Pass. All the related information is stated in the instruction handbook
	- instructions for connecting the machine to power supply (particularly about protection against electrical overloading);	Pass. All the related information is stated in the instruction handbook
	- advice about waste removal /disposal;	Pass. All the related information is stated in the instruction handbook
	- if necessary, recommendations about protective measures which have to be taken by the user; e.g. additional safeguards (see ISO 12100-1:2003, figure 1, note 4), safety distances, safety signs and signals.	Pass. All the related information is stated in the instruction handbook
	c) information relating to the machine itself, e.g. :	-

Clause	EN ISO 12100: 2010	Result
	- detailed description of the machine, its fittings, its guards and/or protective devices;	Pass. All the related information is stated in the instruction handbook
	- comprehensive range of applications for which the machine is intended, including prohibited usages, if any , taking into account variations of the original machine if appropriate.	Pass. All the related information is stated in the instruction handbook
	- diagrams (especially schematic representation of safety functions);	Pass. All the related information is stated in the instruction handbook
	- data about noise and vibration generated by the machine, about radiation , gases, vapours, dust emitted by it, with reference to the measuring methods used.	Pass. All the related information is stated in the instruction handbook
	- technical documentation about electrical equipment (see IEC 60204 series)	Pass. All the related information is stated in the instruction handbook
	- documents attesting that the machine complies with mandatory requirements;	Pass. All the related information is stated in the instruction handbook
	d) information relating to the use of the machine, e.g. about:	-
	- intended use;	Pass. All the related information is stated in the instruction handbook
	- description of manual controls (actuators);	Pass. All the related information is stated in the instruction handbook
	- setting and adjustment;	Pass. All the related information is stated in the instruction handbook
	- modes and means for stopping (especially emergency stop)	Pass. All the related information is stated in the instruction handbook
	- risks which could not be eliminated by the protective measures taken by the designer;	Pass. All the related information is stated in the instruction handbook
	- particular risks which may be generated by certain applications, by the use of certain fittings, and about specific safeguards which are necessary for such applications.	Pass. All the related information is stated in the instruction handbook
	- reasonably foreseeable misuse and prohibited usages;	Pass. All the related information is stated in the instruction handbook
	- fault identification and location , repair, and re-starting after an intervention;	Pass. All the related information is stated in the instruction handbook
	- personal protective equipment which need to be used and training required.	Pass. All the related information is stated in the instruction handbook
	e) information for maintenance e.g.	-
	- nature and frequency of inspections for safety functions;	Pass. All the related information is stated in the instruction handbook
	- instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence should be carried out exclusively by skilled persons (e.g. maintenance staff, specialists)	Pass. All the related information is stated in the instruction handbook

Clause	EN ISO 12100: 2010	Result
	- instructions relating to maintenance actions (e.g. replacement of parts) which do not require specific skills and hence may be carried out by users (e.g. operators)	Pass. All the related information is stated in the instruction handbook
	- drawings and diagrams enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks)	Pass. All the related information is stated in the instruction handbook
	f) information relating to de-commissioning , dismantling and disposal;	Pass. All the related information is stated in the instruction handbook
	g) information for emergency situations , e.g. :	Pass. All the related information is stated in the instruction handbook
	- type of fire-fighting equipment to be used.	Pass. All the related information is stated in the instruction handbook
	- warning about possible emission or leakage of harmful substance(s), and if possible, indication of means to fight their effects.	Pass. All the related information is stated in the instruction handbook
	h) maintenance instructions provided for skilled persons (second dash in e))and maintenance instructions provided for unskilled persons (third dash in e)), that should appear clearly separated from each other.	Pass. All the related information is stated in the instruction handbook
6.4.5.2	Production of the instruction handbook	-
	a) type and size of print shall ensure the best possible legibility. Safety warnings and/or cautions should be emphasized b the use of colours, symbols and/or large print.	Pass. All the related information is stated in the instruction handbook
	b) information for use shall be given in the language(s) of the country in which the machine will be used for the first time and in the original version. If more than one language are to be used, each language should be readily distinguished from the other(s), and efforts should be made to keep the translated text and the relevant illustration together.	Pass. All the related information is stated in the instruction handbook
	c) whenever helpful to the understanding, text should be supplemented with written details enabling , for instance, manual controls (actuators) to be located and identified; they should not be separated from the accompanying text and should follow sequential operations.	Pass. All the related information is stated in the instruction handbook
	d) consideration should be given to presenting information in tabular form where this will aid understanding. Tables should be adjacent to the relevant text.	Pass. All the related information is stated in the instruction handbook
	e) the use of colours should be considered, particularly in relation to components requiring quick identification.	Pass. All the related information is stated in the instruction handbook
	f) when information for use is lengthy, a table of contents and/or an index should be given.	Pass. All the related information is stated in the instruction handbook
	g) safety-relevant instructions which involve immediate action should be provided in a form readily available to the operator.	Pass. All the related information is stated in the instruction handbook
6.4.5.3	Drafting and editing information for use	-

Clause	EN ISO 12100: 2010	Result
	a) relationship to model : the information shall clearly relate to the specific model of machine and, if necessary, other appropriate identification (for example, by serial number).	Pass. All the related information is stated in the instruction handbook
	b) communicate principles : when information for use is being prepared, the communication process “see-think-use” should be followed in order to achieve the maximum effect and should follow sequential operations. The questions “how ?” and “why ?” should be anticipated and the answers provided.	Pass. All the related information is stated in the instruction handbook
	c) information for use shall be as simple and as brief as possible, and should be expressed in consistent terms and units with a clear explanation of unusual technical terms.	Pass. All the related information is stated in the instruction handbook
	d) when it is foreseen that a machine will b put to non-professional use, the instructions should be written in a form that is readily understood by the non-professional users. If personal protective equipment is required for the safe use of the machine, clear advice should be given, e.g. on the packaging as well as on the machine, so that this information is prominently displayed at the point of sale.	Pass. All the related information is stated in the instruction handbook
	e) durability and availability of the documents : documents giving instructions for use should be produced in durable form (i.e. they should be able to survive frequent handling by the user). It may be useful to mark them “keep for future reference”. Where information for use is kept in electronic form (e.g. CD, DVD, tape) information on safety-related issues that need immediate action shall always be backed up with a hand copy that is readily available.	Pass. All the related information is stated in the instruction handbook
7	Documentation of risk assessment and risk reduction	
	The documentation shall demonstrate the procedure that has been followed and the results that have been achieved. This includes, when relevant, documentation of	
	a) the machinery for which the risk assessment has been made (for example, specifications, limits, intended use);	Pass.
	b) any relevant assumptions that have been made (loads, strengths, safety factors, etc.);	Pass.
	c) the hazards and hazardous situations identified and the hazardous events considered in the risk assessment;	Pass.
	d) the information on which risk assessment was based (see 5.2):	Pass.
	1) the data used and the sources (accident histories, experience gained from risk reduction applied to similar machinery, etc.);	Pass.
	2) the uncertainty associated with the data used and its impact on the risk assessment;	Pass.
	e) the risk reduction objectives to be achieved by protective measures;	Pass.
	f) the protective measures implemented to eliminate identified hazards or to reduce risk;	Pass.
	g) residual risks associated with the machinery;	Pass.
	h) the result of the risk assessment (see Figure 1);	Pass.
	i) any forms completed during the risk assessment.	Pass.

Clause	EN ISO 12100: 2010	Result
	Standards or other specifications used to select protective measures referred to in f) above should be referenced.	Pass.

Noise test report

I. Applicable standards

15 EN ISO 3746 Acoustics - Determination of sound power levels of noise sources using sound pressure Survey method using an enveloping measurement surface over a reflecting plane.

16 EN ISO 11202 Acoustics - Noise emitted by machinery and equipment Measurement of emission sound pressure levels at the work station and at other specified positions Survey method in situ.

17 ISO/TR 11688-1 Acoustics - Recommended practice for the design of low-noise machinery and equipment Part 1Planning.

II. Test instrument

The sound level meter used in the noise measurement is TES1350A manufactured by TES Electrical Electronic Corp. with the following features

18 Portable with light weight easy operation.

19 Measurement range from 35 to 130 dB A .

20 Type 1 precision.

21 With “F” ”S” detect mode in accordance with IEC 651 type 1.

22 Built in A-weighting network.

23 Equipped with a high prepolarized condenser microphone.

24 With automatic manual display.

25 DC output for level recorder.

III. Measurement method

The measurements of this test have been carried out by a hand-held sound level meter, and readings are taken by A-frequency weighting at each measuring position. For operator positions in process of measurement, the measuring instrument is to be set at a distance of

1 m from the machine and 1.5 m above the floor.

IV. Test environment

The test was carried out in the location of machine inside the factory, and the background noise has been ensure that its measuring value is lower than that of machine.

V. Test result

26 Background Reading value : 57.6 dB(A)

Position	1	2	3	4	5
Reading (dB (A))	82.5	82.4	79.2	86.8	82.1

27 Sound pressure level (machine on “Stand by” and normal load condition)

Position	1	2	3	4	5
Reading (dB (A))	-	-	-	-	-

28 Sound pressure level (machine on full load condition)

Position	1	2	3	4	5
Readings (dB (A))	-	-	-	-	-
Position	6	7	8	9	Lw
Readings (dB (A))	-	-	-	-	-

29 Sound power level (where the measuring value of sound pressure level exceeds 85 dB(A))

The following is the calculation formula of L_{wA} (Sound power level):

$$L_{wA} = L_{pf} + 10 \times \log (S/So)$$

L_{pf} is the A-weighted or frequency bank surface sound pressure level	
S is the area of the measurement surface in square meters S_0 is 1 m2	20 m^2

Test Item	Requirement &Test Method	Result	Verdict
EN 792-3 Hand-held non-electric power tools — Safety requirements — Part 3: Drills and tappers			
5	Safety requirements and measures		P
5.1	Mechanical safety		P
5.1.1	Surfaces, edges and corners Accessible parts of the power tools shall not have sharp edges or angles or rough or abrasive surfaces, see 3.1 of EN 292-2:1991.		P
5.1.2	Supporting surface and stability Power tools shall be so designed that they can be laid aside and remain in stable position on a plane surface.		P
5.1.3	Chuck keys and service tools Chuck keys and service tools used with drilling and tapping chucks shall be so designed that they drop easily out of position when released. They may be fixed to the power tool by design, e.g. clip, but not by a chain or string or other similar means.		P
5.1.4	High pressure ejection Hydraulic systems of the power tools shall be enclosed so as to give protection against high pressure fluid ejection.		P
5.1.5	Guards Guards covering the chuck and inserted tools are not required.		P
5.2	Thermal safety Surface temperatures of parts of the power tools which are held during use or could be inadvertently touched shall follow the provisions of EN 563.		P
5.3	Noise		P
5.3.1	General The emission of noise from a hand-held power tool shall be kept as low as possible. The noise emission from using hand-held power tools emanates from three main sources: - the hand-held power tool itself, - the inserted tool, - the workpiece.		P
5.3.2	Noise emitted by the hand-held power tool The noise emitted by the hand-held power tool itself can be divided into: - noise from the motor, - noise from exhaust air at pneumatic tools, - vibration induced noise.		P
5.4	Vibration Vibration at the handle of a hand-held power tool shall be kept as low as possible. The principles contained in CR 1030-1 should be followed to reduce the vibration emitted by the power tool.		P
5.5	Materials and substances processed, used or exhausted		P

Test Item	Requirement &Test Method	Result	Verdict
5.5.1	Exhaust air For power tools driven with compressed air the exhaust air shall be directed in such a way that it cannot cause a hazard to the operator and so that any secondary effects are minimized. e.g. blowing the dust and reflected air from the workpiece onto the operator.		P
5.5.2	Dust It shall be possible to connect to drills a dust collecting device or to use a dust suppression device.		P
	5.5.3 Lubricants Lubricants for power tools, specified by the manufacturer, shall not cause hazards to the operator or the environment.		P
5.6	Ergonomics		P
5.6.1	Design of the handle		P
5.6.2	Control device The control device shall be adapted to the handle or to the part of the power tool being gripped by the operator so that it can be held comfortably in the run position. For power tools which are normally are started frequently and often used for precision works the trigger force should be small.		P
5.6.3	Suspension device Provision shall be made, where appropriate, to enable the attachment to the power tool of a suspension device. The fitting of a suspension device shall not introduce an additional hazard.		P
5.6.4	Reaction torque Drills and tappers shall be designed so that the effect of reaction torque is reduced as much as possible. This can be done by mounting a support handle or other suitable means. There shall be provisions for mounting a support handle when the chuck capacity is equal or larger than 16 mm. Straight rotary tools shall have provisions for mounting a second handle, when the reaction torque is over 4 Nm. Pistol grip tools shall have a provision for mounting a second handle, when the reaction torque is over 10 Nm.		P
5.7	Safety related measures and means		P
5.7.1	Start and stop device Drills and tappers shall be equipped with a single control device to start or stop them. It shall be arranged near the handle so that the operator can activate it without releasing the grip on the handles.		P
5.7.2	Unintentional start The start and stop device for drills and tappers with chuck capacity larger than 10 mm shall be so designed, positioned or guarded that the risk of unintentional start is minimized. Verification shall be made according to 7.3.		P
6	Information for use		P

Test Item	Requirement &Test Method	Result	Verdict
6.1	Marking, signs and written warnings Drills and tappers shall be marked visibly, legibly and indelibly with the following minimum particulars: - the business name and full address of the manufacturer and, where applicable, his authorized 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.		P
6.2	Instruction for use		P
6.2.1	General The instructions for use shall be drawn up by the manufacturer and contain: - operator's instruction - maintenance instruction.		P
6.2.2	Operator's instruction The operator's instruction shall include a description of the correct use of the drill or tapper and make reference to the appropriate inserted tools. The operator's instruction shall state that any other use is forbidden. Foreseeable misuse of the power tool, which experience has shown to occur, shall be warned against. The operator's instruction shall give 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 shall be indicated; - the peak C-weighted instantaneous sound pressure value at workstations, where this value 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).		P
6.2.3	Maintenance instruction The maintenance instruction shall contain: - instruction to keep the power tool safe by regular maintenance; - information on when the regular maintenance shall be carried out; for instance after a specified time of operation, a specified number of cycles/operations, a stated number of times per year; - instructions for disposal so as not to impose hazards to personnel and the environment; - the specifications of the spare parts to be used, when these affect the health and safety of operators.		P
7	Verification		P
7.1	Noise		P
			P

Test Item	Requirement &Test Method	Result	Verdict
7.2	Vibration Compliance with 5.4 and 6.2.2 shall be verified as follows: The vibration level at the handle of the power tool shall be measured and stated according to EN 28662-1. The vibration value shall be declared according to EN 12096.		P
7.3	Unintentional start Compliance with 5.7.2 shall be verified as follows: The drill or tapper with chuck capacity larger than 10 mm shall be connected to the energy supply and placed in any possible position and pulled over the horizontal plane by its hose. Continuous operation of the start and stop device shall then not occur.		P

PHOTOS OF PRODUCT SAMPLE






THE END OF REPORT