Prüfprogramm nach Maschinenrichtlinie 2006/42/EG

Test program according to machinery directive 2006/42/EC

Revisionsstand: *Edition:*	00	Revisionsdatum: *Date of Edition:*	29.08.2016

Mindestanforderungen und Prüfungen *(Minimum requirements and tests)*

Prüfzeitraum: *Period of testing*	Auftragsnummer: *Order number:*	Sachbearbeiter: *Test engineer:*
von: *Beginning:* 29.08.2016	OPE-164096	Oelgemöller, K-H.
bis: *Termination:*		

Antragsteller: Applicant:	Norbert Wienold GmbH, Material- und Personenlifte, Industriegebiet Waldstr. 35 a, D-48488 Emsbüren
Produktart: *Type of product:*	MFC 750
Hersteller: *Manufacturer:*	Norbert Wienold GmbH, Material- und Personenlifte, Industriegebiet Waldstr. 35 a, D-48488 Emsbüren
Vertreiber: *Merchant:*	Norbert Wienold GmbH, Material- und Personenlifte, Industriegebiet Waldstr. 35 a, D-48488 Emsbüren
Typenbezeichnung: *Type:*	MFC 750
Fabrik- / Serien-Nr.: *Serial number:*	
Zubehör: *Accessories:*	Nein
Kenndaten: *Characteristics:*	Traglast: 500kg bei max. Auslage von 1,0m vor dem Rad (Ausführung lang)(bei 28 x 16kg)
Sonstiges: *Miscellaneous:*	Traglast: 250 kg bei max. Auslage von 1,0m vor dem Rad (Ausführung kurz)(bei 28 x 16kg)
Mitgeltende Normen: *Also effective standards:*	- DIN EN 13001-1- Krane – Konstruktion allgemein – Teil 1: Allgemeine Prinzipien und Anforderungen - DIN EN 13001-2- Kransicherheit – Konstruktion allgemein – Teil 2: Lasteinwirkungen - DIN EN 14492-1- Krane –Kraftgetriebene Winden und Hubwerke – Teil 1: Kraftge-triebene Winden - DIN EN 14492-2- Krane – Kraftgetriebene Winden und Hubwerke – Teil 2: Kraftge-triebene Hubwerke DIN EN 60529 (VDE 0470-1):2014-09 Schutzarten durch Gehäuse (IP-Code) (IEC 60529:1989 + A1 :1999 + A2:2013); Deutsche Fassung EN 60529:1991 + A1:2000 + A2:2013

	Datum: *(Date)*	Prüfer: *(Inspector)*		
Hauptprüfung am: *General inspection on:*	27.10.2016	Dipl.-Ing. K-H. Oelgemöller	pos. ☐	neg. ☐
1. Nachprüfung am: *1st check over on:*			pos. ☐	neg. ☐
2. Nachprüfung am: *2nd check over on:*			pos. ☐	neg. ☐

Item	Requirements of directive abbreviations: S: Severity of potential injuries/health defects F: Length of stay in the area of risk A: Opportunity to evade danger O: Probability of occurrence	appli-cable	not appli-cable	capacity of machine/ intended use/potential predictable operating error	hazard/ hazardous situation	S	F	A	O	index of risk/ risk reduction necessary?	safeguarding: Is an inherent safety construction possible? Technical safeguarding possible? Warning of remaining risk possible?	applied standards comment	risk reduction of safeguarding achieved?
1.	Essential health and safety requirements relating to the the design and construction of machinery												
1.1	GENERAL PRINCIPLES												
1.1.1	Definitions												
	For the purpose of this Annex:												
	(a) ‘hazard’ means a potential source of injury or damage to health												
	(b) ‘danger zone’ means any zone within and/or around machinery in which a person is subject to a risk to his health or safety												
	(c) ‘exposed person’ means any person wholly or partially in a danger zone												
	(d) ‘operator’ means the person or persons installing, operating, adjusting, maintaining, cleaning, repairing or moving machinery												
	(e) ‘risk’ means a combination of the probability and the degree of an injury or damage to health that can arise in a hazardous situation												
	(f) ‘guard’ means a part of the machinery used specifically to provide protection by means of a physical barrier												
	(g) ‘protective device’ means a device (other than a guard) which reduces the risk, either alone or in conjunction with a guard												
	(h) ‘intended use’ means the use of machinery in accordance with the information provided in the instructions for use												
	(i) ‘reasonably foreseeable misuse’ means the use of machinery in a way not intended in the instructions for use, but which may result from readily predictable human behaviour												
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 theconditions foreseen but also taking into account any reasonably foreseeable misuse thereof												

	The aim of measures taken must be to eliminate any risk throughout the foreseeable lifetime of themachinery including the phases of transport, assembly, dismantling, disabling and scrapping												
	(b) In selecting the most appropriate methods, the manufacturer or his authorised representative must apply the following principles, in the order given												
	— eliminate or reduce risks as far as possible (inherently safe machinery design and construction												
	— take the necessary protective measures in relation to risks that cannot be eliminated												
	— inform users of the residual risks due to any shortcomings of the protective measures adopted, indicate whether any particular training is required and specify any need to provide personal protective equipment												
	(c) When designing and constructing machinery and when drafting the instructions, the manufacturer or his authorised representative must envisage not only the intended use of the machinery but also any reasonably foreseeable misuse thereof												
	The machinery must be designed and constructed in such a way as to prevent abnormal use 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												
	(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												
	(e) Machinery must be supplied with all the special equipment and accessories essential to enable it to be adjusted, maintained and used safely												
1.1.3.	Materials and products												
	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	x		material confusions in production process of components		2	1	1	1	2/ yes	to document material assignment for load- bearing components and welding seams. CE- declaration incomplete unit from subcontractor	material assignment for statically relevant components according to DIN EN 10204-3.1 quality requirements for fusion welding of metallic materials standard according to ISO3834-4	yes
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.		x										
	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.		x										
	Internal parts requiring frequent inspection and adjustment, and maintenance areas must be provided with appropriate lighting.		x										
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	x				1	1	1	1	1/ no		operating instructions	yes
	— be packaged or designed so that it can be stored safely and without damage	x				1	1	1	1	1/ no		operating instructions	yes
	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.	x				1	1	1	1	1/ no		operating instructions	yes
	Where the weight, size or shape of machinery or its various component parts prevents them from being moved by hand, the machinery or each component part must:												
	— either be fitted with attachments for lifting gear, or	x			transport	1	1	1	1	1/ yes	attachment point at outrigger	if machine as a whole is loaded, the attachment point etc. operating instructions	yes
	— be designed so that it can be fitted with such attachments, or		x										
	— be shaped in such a way that standard lifting gear can easily be attached		x										
	Where machinery or one of its component parts is to be moved by hand, it must:												
	— either be easily moveable, or	x				1	1	1	1	1/ yes		special chassis operating instructions	yes
	— be equipped for picking up and moving safely	x				1	1	1	1	1/ yes		manual bar for pushing operating instructions	yes

	Special arrangements must be made for the handling of tools and/or machinery parts which, even if lightweight, could be hazardous.					1	1	1	1	1/ no	grab handle, special grabbings of load	counterweights crane boom operating instructions	yes
1.1.6.	Ergonomics		x										
	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:		x										
	— allowing for the variability of the operator's physical dimensions, strength and stamina		x										
	— providing enough space for movements of the parts of the operator's body,		x										
	— avoiding a machine-determined work rate		x										
	— avoiding monitoring that requires lengthy concentration		x										
	— adapting the man/machinery interface to the foreseeable characteristics of the operators.		x										
1.1.7.	Operating positions		x										
	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		x										
	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.		x										
	Where appropriate, the operating position must be fitted with an adequate cabin designed, constructed and/or equipped to fulfil the above requirements. The exit must allow rapid evacuation. Moreover, when applicable, an emergency exit must be provided in a direction which is different from the usual exit		x										
1.1.8.	Seating		x										
	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.		x										
	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.		x										
	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.		x										

	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.		x										
1.2.	CONTROL SYSTEMS	x		operating instructions Mini Crane								to guarantee safe and appropriate use of the unit, the unit is to put into operation exclusively by operators instructed by authorized specialists.	
1.2.1.	Safety and reliability of control systems		x										
	Control systems must be designed and constructed in such a way as to prevent hazardous situations from arising. Above all, they must be designed and constructed in such a way that:												
	— they can withstand the intended operating stresses and external influences,												
	— a fault in the hardware or the software of the control system does not lead to hazardous situations,												
	— errors in the control system logic do not lead to hazardous situations,												
	— reasonably foreseeable human error during operation does not lead to hazardous situations.												
	Particular attention must be given to the following points:												
	— the machinery must not start unexpectedly,												
	— the parameters of the machinery must not change in an uncontrolled way, where such change may lead to hazardous situations,												
	— the machinery must not be prevented from stopping if the stop command has already been given,												
	— no moving part of the machinery or piece held by the machinery must fall or be ejected,												
	— automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,												
	— the protective devices must remain fully effective or give a stop command,												
	— the safety-related parts of the control system must apply in a coherent way to the whole of an assembly of machinery and/or partly completed machinery.												
	For cable-less control, an automatic stop must be activated when correct control signals are not received, including loss of communication.												

1.2.2.	Control devices												
	Control devices must be:												
	— clearly visible and identifiable, using pictograms where appropriate,												
	— positioned in such a way as to be safely operated without hesitation or loss of time and without ambiguity,												
	— designed in such a way that the movement of the control device is consistent with its effect,												
	— located outside the danger zones, except where necessary for certain control devices such as an emergency stop or a teach pendant,												
	— positioned in such a way that their operation cannot 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,												
	— 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.												
	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.												
	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.												
	Machinery must be fitted with indicators as required for safe operation. The operator must be able to read them from the control position.												
	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.	x											
	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.												
	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.	x											

	Where there is more than one control position, the control system must be designed in such a way that the use of one of them precludes the use of the others, except for stop controls and emergency stops.												
	When machinery has two or more operating positions, each position must be provided with all the required control devices without the operators hindering or putting each other into a hazardous situation.												
1.2.3.	Starting												
	It must be possible to start machinery only by voluntary actuation of a control device provided for the purpose.	x											
	The same requirement applies:												
	— when restarting the machinery after a stoppage, whatever the cause,												
	— when effecting a significant change in the operating conditions.												
	However, the restarting of the machinery or a change in operating conditions may be effected by voluntary actuation of a device other than the control device provided for the purpose, on condition that this does not lead to a hazardous situation.												
	For machinery functioning in automatic mode, the starting of the machinery, restarting after a stoppage, or a change in operating conditions may be possible without intervention, provided this does not lead to a hazardous situation.												
	Where machinery has several starting control devices and the operators can therefore put each other in danger, additional devices must be fitted to rule out such 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.												
1.2.4.	Stopping												
1.2.4.1.	Normal stop		x										
	Machinery must be fitted with a control device whereby the machinery can be brought safely to a complete stop.												
	Each workstation must be fitted with a control device to stop some or all of the functions of the machinery, depending on the existing hazards, so that the machinery is rendered safe.												
	The machinery's stop control must have priority over the start controls.												

	Once the machinery or its hazardous functions have stopped, the energy supply to the actuators concerned must be cut off.												
1.2.4.2.	Operational stop		x										
	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.												
1.2.4.3.	Emergency stop		x										
	Machinery must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted.												
	The following exceptions apply:												
	— machinery in which an emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would not enable the special measures required to deal with the risk to be taken,												
	— portable hand-held and/or hand-guided machinery.												
	The device must:												
	— have clearly identifiable, clearly visible and quickly accessible control devices,												
	— stop the hazardous process as quickly as possible, without creating additional risks,												
	— where necessary, trigger or permit the triggering of certain safeguard movements.												
	Once active operation of the emergency stop device has ceased following a stop command, that command must be sustained by engagement of the emergency stop device until that engagement is specifically overridden; it must not be possible to engage the device without triggering a stop command; it must be possible to disengage the device only by an appropriate operation, and disengaging the device must not restart the machinery but only permit restarting.												
	The emergency stop function must be available and operational at all times, regardless of the operating mode.												
	Emergency stop devices must be a back-up to other safeguarding measures and not a substitute for them.												
1.2.4.4.	Assembly of machinery		x										
	In the case of machinery or parts of machinery designed to work together, the machinery must be designed and constructed in such a way that the stop controls, including the emergency stop devices, can stop not only the machinery itself but also all related equipment, if its continued operation may be dangerous.												

1.2.5.	Selection of control or operating modes		x										
	The control or operating mode selected must override all other control or operating modes, with the exception of the emergency stop.												
	If machinery has been designed and constructed to allow its use in several control or operating modes requiring different protective measures and/or work procedures, it must be fitted with a mode selector which can be locked in each position. Each position of the selector must be clearly identifiable and must correspond to a single operating or control mode.												
	The selector may be replaced by another selection method which restricts the use of certain functions of the machinery to certain categories of operator.												
	If, for certain operations, the machinery must be able to operate with a guard displaced or removed and/or a protective device disabled, the control or operating mode selector must simultaneously:												
	— disable all other control or operating modes,												
	— permit operation of hazardous functions only by control devices requiring sustained action,												
	— permit the operation of hazardous functions only in reduced risk conditions while preventing hazards from linked sequences,												
	— prevent any operation of hazardous functions by voluntary or involuntary action on the machine's sensors.												
	If these four conditions cannot be fulfilled simultaneously, the control or operating mode selector must activate other protective measures designed and constructed to ensure a safe intervention zone.												
	In addition, the operator must be able to control operation of the parts he is working on from the adjustment point.												
1.2.6.	Failure of the power supply		x										
	The interruption, the re-establishment after an interruption or the fluctuation in whatever manner of the power supply to the machinery must not lead to dangerous situations.												
	Particular attention must be given to the following points:												
	— the machinery must not start unexpectedly,												
	— the parameters of the machinery must not change in an uncontrolled way when such change can lead to hazardous situations,												

	— the machinery must not be prevented from stopping if the command has already been given,												
	— no moving part of the machinery or piece held by the machinery must fall or be ejected,												
	— automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,												
	— the protective devices must remain fully effective or give a stop command.												
1.3.	PROTECTION AGAINST MECHANICAL HAZARDS											to guarantee safe and appropriate use of the unit, the unit is to put into operation exclusively by operators instructed by authorized specialists	
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.	x		use only on firm and level surface - no wind load -load center within permitted limit	tilting	2	2	1	2	4/ yes	additional outrigger; counterweights	DIN EN 13001 verification of stability verification of strength operating instructions	yes
	If the shape of the machinery itself or its intended installation does not offer sufficient stability, appropriate means of anchorage must be incorporated and indicated in the instructions.		x										
1.3.2.	Risk of break-up during operation												
	The various parts of machinery and their linkages must be able to withstand the stresses to which they are subject when used.	x		DIN EN 13001		2	1	1	1	2/ yes		verification of strength overload test of each unit operating instructions	yes
	The durability of the materials used must be adequate for the nature of the working environment foreseen by the manufacturer or his authorised representative, in particular as regards the phenomena of fatigue, ageing, corrosion and abrasion.	x		no overload material grade change	breakage	2	1	1	1	1/ yes	to document material assignment for load-bearing components and welding seams CE- declaration incomplete machine from subconstructor	material assignment for statically relevant components according to DIN EN 10204-3.1 quality requirements for fusion welding of metallic materials according to ISO3834-4 operating instructions maintenance instruction	yes
	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.	x				2	1	1	2	2/ yes	deformed or damaged components are to be changed immediately	operating instructions maintenance instruction	yes

	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.	x											
	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.	x											
	Where the material to be processed is fed to the tool automatically, the following conditions must be fulfilled to avoid risks to persons:	x											
	— when the workpiece comes into contact with the tool, the latter must have attained its normal working condition,	x											
	— when the tool starts and/or stops (intentionally or accidentally), the feed movement and the tool movement must be coordinated.	x											
1.3.3.	Risks due to falling or ejected objects												
	Precautions must be taken to prevent risks from falling or ejected objects.	x		DIN EN 13001	fallind down	2	1	1	2	2/ yes	load placed and secured	operating instructions	yes
1.3.4.	Risks due to surfaces, edges or angles												
	Insofar 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.	x		machine functions		1	1	1	1	1/ yes	to deburr, to round	production documents	yes
1.3.5.	Risks related to combined machinery		x										
	Where the machinery is intended to carry out several different operations with manual removal of the piece between each operation (combined machinery), it must be designed and constructed in such a way as to enable each element to be used separately without the other elements constituting a risk for exposed persons.		x										
	For this purpose, it must be possible to start and stop separately any elements that are not protected.		x										
1.3.6.	Risks related to variations in operating conditions												
	Where the machinery performs operations under different conditions of use, it must be designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably.	x		crane boom	stability	2	1	1	2	2/ yes	admissable load capacity only to use in center of gravity of lifting accessories (pay attention to load table)	modification information	
1.3.7.	Risks related to moving parts												

	The moving parts of machinery must be designed and constructed in such a way as to prevent risks of contact which could lead to accidents or must, where risks persist, be fitted with guards or protective devices.	x		boom/ casters	relative movement	1	1	1	1	1/ yes	tight guide clearance between segments of outriggers		yes
	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.	x		blocking of extension arm	clamp, pinch	2	1	1	2	2/ yes		strength calculation no occurence in similar applications when load used as intended prevent penetration of dirt	yes
	The instructions and, where possible, a sign on the machinery shall identify these specific protective devices and how they are to be used.	x		result of further analysis	clamp, pinch	1	1	1	1	1/ yes	take into account constructively	operating instructions	yes
1.3.8.	Choice of protection against risks arising from moving parts												
	Guards or protective devices designed to protect against risks arising from moving parts must be selected on the basis of the type of risk. The following guidelines must be used to help to make the choice.	x											
1.3.8.1.	Moving transmission parts												
	Guards designed to protect persons against the hazards generated by moving transmission parts must be:	x		hydraulic cylinder	clamp, pinch	1	1	1	1	1/yes	covering	operating instructions, documentation	yes
	— either fixed guards as referred to in section 1.4.2.1, or	x											
	— interlocking movable guards as referred to in section 1.4.2.2.		x										
	Interlocking movable guards should be used where frequent access is envisaged.		x										
1.3.8.2.	Moving parts involved in the process	x		hydraulic cylinder	clamp, pinch	1	1	1	1	1/ yes	tight split		yes
	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	x		outrigger	clamp, pinch	1	1	1	1	1/ yes	tight split		yes
	— interlocking movable guards as referred to in section 1.4.2.2, or		x										
	— protective devices as referred to in section 1.4.3, or		x										
	— a combination of the above.		x										
	However, when certain moving parts directly involved in the process cannot be made completely inaccessible during operation owing to operations requiring operator intervention, such parts must be fitted with:		x										
	— fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and		x										

	— adjustable guards as referred to in section 1.4.2.3 restricting access to those sections of the moving parts where access is necessary.		x										
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.	x		lockable castors at chassis	tilting	2	1	1	2	2/ yes	parking brakes at wheels		yes
1.4.	REQUIRED CHARACTERISTICS OF GUARDS AND PROTECTIVE DEVICES												
1.4.1.	General requirements												
	Guards and protective devices must:	x				1	1	1	1	1/ yes	had been taken into account when constructed		yes
	— be of robust construction,	x				1	1	1	1	1/ yes	had been taken into account when constructed		yes
	— be securely held in place,	x				1	1	1	1	1/ yes	had been taken into account when constructed		yes
	— not give rise to any additional hazard,	x				1	1	1	1	1/ yes	had been taken into account when constructed		yes
	— not be easy to by-pass or render non-operational,	x				1	1	1	1	1/ yes	had been taken into account when constructed		yes
	— be located at an adequate distance from the danger zone,	x				1	1	1	1	1/ yes	had been taken into account when constructed		yes
	— cause minimum obstruction to the view of the production process, and	x				1	1	1	1	1/yes	had been taken into account when constructed		yes
	— enable essential work to be carried out on the installation and/or replacement of tools and for maintenance purposes by restricting access exclusively to the area where the work has to be done, if possible without the guard having to be removed or the protective device having to be disabled.	x		outrigger		1	1	1	1	1/ yes	had been taken into account when constructed		yes
	In addition, guards must, where possible, protect against the ejection or falling of materials or objects and against emissions generated by the machinery.												
1.4.2.	Special requirements for guards		x										
1.4.2.1.	Fixed guards		x										
	Fixed guards must be fixed by systems that can be opened or removed only with tools.		x										

	Their fixing systems must remain attached to the guards or to the machinery when the guards are removed.		x										
	Where possible, guards must be incapable of remaining in place without their fixings.		x										
1.4.2.2.	Interlocking movable guards		x										
	Interlocking movable guards must:		x										
	— as far as possible remain attached to the machinery when open,		x										
	— be designed and constructed in such a way that they can be adjusted only by means of an intentional action.		x										
	Interlocking movable guards must be associated with an interlocking device that:		x										
	— prevents the start of hazardous machinery functions until they are closed and		x										
	— gives a stop command whenever they are no longer closed.		x										
	Where it is possible for an operator to reach the danger zone before the risk due to the hazardous machinery functions has ceased, movable guards must be associated with a guard locking device in addition to an interlocking device that:		x										
	— prevents the start of hazardous machinery functions until the guard is closed and locked, and		x										
	— keeps the guard closed and locked until the risk of injury from the hazardous machinery functions has ceased.		x										
	Interlocking movable guards must be designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous machinery functions.		x										
1.4.2.3.	Adjustable guards restricting access		x										
	Adjustable guards restricting access to those areas of the moving parts strictly necessary for the work must be:		x										
	— adjustable manually or automatically, depending on the type of work involved, and		x										
	— readily adjustable without the use of tools.		x										
1.4.3.	Special requirements for protective devices		x										
	Protective devices must be designed and incorporated into the control system in such a way that:		x										
	— moving parts cannot start up while they are within the operator's reach,		x										
	— persons cannot reach moving parts while the parts are moving, and		x										

	— the absence or failure of one of their components prevents starting or stops the moving parts.		x										
	Protective devices must be adjustable only by means of an intentional action.		x										
1.5.	RISKS DUE TO OTHER HAZARDS		x	electrician								to guarantee safe and appropriate use of the unit, the unit is to put into operation exclusively by operators instructed by authorized specialists	
1.5.1.	Electricity supply		x										
	Where machinery has an electricity supply, it must be designed, constructed and equipped in such a way that all hazards of an electrical nature are or can be prevented.		x										
	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.												
1.5.2.	Static electricity												
	Machinery must be designed and constructed to prevent or limit the build-up of potentially dangerous electrostatic charges and/or be fitted with a discharging system.	x		antistatic wheels		1	1	1	1	1/ yes	had been taken into account when constructed	operating instructions	yes
1.5.3.	Energy supply other than electricity		x										
	Where machinery is powered by source of energy other than electricity, it must be so designed, constructed and equipped as to avoid all potential risks associated with such sources of energy.		x										
1.5.4.	Errors 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.	x		assembly instruction/ operating instructions	stability, breakage	2	1	1	1	2/ yes	trained personnel	technical drawings; operating instructions	yes
	Where necessary, the instructions must give further information on these risks	x				2	1	1	2	2/ yes	trained personnel	technical drawings; operating instructions	yes
	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.	x		fuses, FI		2	1	1	1	2/ yes	trained personnel	technical drawings; operating instructions	yes

1.5.5.	Extreme temperatures												
	Steps must be taken to eliminate any risk of injury arising from contact with or proximity to machinery parts or materials at high or very low temperatures.		x										
	The necessary steps must also be taken to avoid or protect against the risk of hot or very cold material being ejected.		x										
1.5.6.	Fire		x										
	Machinery must be designed and constructed in such a way as to avoid any risk of fire or overheating posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machinery.		x										
1.5.7.	Explosion		x										
	Machinery must be designed and constructed in such a way as to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dust, vapours or other substances produced or used by the machinery.												
	Machinery must comply, as far as the risk of explosion due to its use in a potentially explosive atmosphere is concerned, with the provisions of the specific Community Directives.												
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.	x		measurements→<70 dB(A)		1	1	1	1	1/ no	had been taken into account when constructed	operating instructions dismantling/ assembly	yes
	The level of noise emission may be assessed with reference to comparative emission data for similar machinery.		x	measurements		1	1	1	1	1/ no	had been taken into account when constructed	operating instructions dismantling/ assembly	yes
1.5.9.	Vibrations		x										
	Machinery must be designed and constructed in such a way that risks resulting from vibrations produced by the machinery are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source.		x										
	The level of vibration emission may be assessed with reference to comparative emission data for similar machinery.		x										
1.5.10.	Radiation		x	control device									
	Undesirable radiation emissions from the machinery must be eliminated or be reduced to levels that do not have adverse effects on persons.												

	Any functional ionising radiation emissions must be limited to the lowest level which is sufficient for the proper functioning of the machinery during setting, operation and cleaning. Where a risk exists, the necessary protective measures must be taken.												
	Any functional non-ionising radiation emissions during setting, operation and cleaning must be limited to levels that do not have adverse effects on persons.												
1.5.11.	External radiation		x										
	Machinery must be designed and constructed in such a way that external radiation does not interfere with its operation.												
1.5.12.	Laser radiation		x										
	Where laser equipment is used, the following should be taken into account:												
	— laser equipment on machinery must be designed and constructed in such a way as to prevent any accidental radiation,												
	— laser equipment on machinery must be protected in such a way that effective radiation, radiation produced by reflection or diffusion and secondary radiation do not damage health,		x										
	— optical equipment for the observation or adjustment of laser equipment on machinery must be such that no health risk is created by laser radiation.		x										
1.5.13.	Emissions of hazardous materials and substances		x										
	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.		x										
	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.		x										
	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.												
1.5.14.	Risk of being trapped in a machine		x										
	Machinery must be designed, constructed or fitted with a means of preventing a person from being enclosed within it or, if that is impossible, with a means of summoning help.		x										
1.5.15.	Risk of slipping, tripping or falling		x										

	Parts of the machinery where persons are liable to move about or stand must be designed and constructed in such a way as to prevent persons slipping, tripping or falling on or off these parts.		x										
	Where appropriate, these parts must be fitted with handholds that are fixed relative to the user and that enable them to maintain their stability.		x										
1.5.16.	Lightning		x										
	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.		x										
1.6.	MAINTENANCE												
1.6.1.	Machinery maintenance	x										operating instructions	
	Adjustment and maintenance points must be located outside danger zones. It must be possible to carry out adjustment, maintenance, repair, cleaning and servicing operations while machinery is at a standstill.	x				1	1	1	1	1/ no		lubrication guide maintenance instruction	yes
	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).		x										
	In the case of automated machinery and, where necessary, other machinery, a connecting device for mounting diagnostic fault-finding equipment must be provided.		x										
	Automated machinery components which have to be changed frequently must be capable of being removed and replaced easily and safely. Access to the components must enable these tasks to be carried out with the necessary technical means in accordance with a specified operating method.		x										
1.6.2.	Access to operating positions 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.	x				1	1	1	1	1/ yes	had been taken into account when constructed	operating instructions dismantling/ assembly	yes
1.6.3.	Isolation of energy sources												
	Machinery must be fitted with means to isolate it from all energy sources. Such isolators must be clearly identified. They must be capable of being locked if reconnection could endanger persons. Isolators must also be capable of being locked where an operator is unable, from any of the points to which he has access, to check that the energy is still cut off.												

	In the case of machinery capable of being plugged into an electricity supply, removal of the plug is sufficient, provided that the operator can check from any of the points to which he has access that the plug remains removed.												
	After the energy is cut off, it must be possible to dissipate normally any energy remaining or stored in the circuits of the machinery without risk to persons.												
	As an exception to the requirement laid down in the previous paragraphs, certain circuits may remain connected to their energy sources in order, for example, to hold parts, to protect information, to light interiors, etc. In this case, special steps must be taken to ensure operator safety.												
1.6.4.	Operator intervention												
	Machinery must be so designed, constructed and equipped that the need for operator intervention is limited. If operator intervention cannot be avoided, it must be possible to carry it out easily and safely.	x		lifting / lowering		1	1	1	1	1/ no	to take into account at construction	operating instructions	yes
1.6.5.	Cleaning of internal parts		x	no machine tool									
	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.												
1.7.	INFORMATION												
1.7.1.	Information and warnings on the machinery	x		operating instructions and label		2	2	2	3	6/ yes	operating instructions pictograms at unit	EG machinery directive	yes
	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.	x											yes
1.7.1.1.	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.	x										operating instructions	yes

	Visual display units or any other interactive means of communication between the operator and the machine must be easily understood and easy to use.		x										
1.7.1.2.	Warning devices												
	Where the health and safety of persons may be endangered by a fault in the operation of unsupervised machinery, the machinery must be equipped in such a way as to give an appropriate acoustic or light signal as a warning.		x										
	Where machinery is equipped with warning devices these must be unambiguous and easily perceived. The operator must have facilities to check the operation of such warning devices at all times.		x										
	The requirements of the specific Community Directives concerning colours and safety signals must be complied with.		x										
1.7.2.	Warning of residual risks												
	Where risks remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, must be provided.	x									operating instructions pictograms at unit	operating instructions informative note about personel protective equipment	yes
1.7.3.	Marking of machinery												
	All machinery must be marked visibly, legibly and indelibly with the following minimum particulars:	x										load center table	yes
	— the business name and full address of the manufacturer and, where applicable, his authorised representative,	x										type plate	yes
	— designation of the machinery,	x											yes
	— the CE Marking (see Annex III),	x											yes
	— designation of series or type,	x											yes
	— serial number, if any,	x											yes
	— the year of construction, that is the year in which the manufacturing process is completed.	x											yes
	It is prohibited to pre-date or post-date the machinery when affixing the CE marking.	x											yes
	Furthermore, machinery designed and constructed for use in a potentially explosive atmosphere must be marked accordingly.		x										
	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.	x									operating instructions pictograms at unit	pictograms	yes
	Where a machine part must be handled during use with lifting equipment, its mass must be indicated legibly, indelibly and unambiguously.		x										
1.7.4.	Instructions												

	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.	x											yes
	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.	x											yes
	By way of exception, the maintenance instructions intended for use by specialised personnel mandated by the manufacturer or his authorised representative may be supplied in only one Community language which the specialised personnel understand.	x											yes
	The instructions must be drafted in accordance with the principles set out below.												
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 authorised representative.	x											yes
	(b) Where no 'Original instructions' exist in the official language(s) of the country where the machinery is to be used, a translation into that/those language(s) must be provided by the manufacturer or his authorised representative or by the person bringing the machinery into the language area in question. The translations must bear the words 'Translation of the original instructions'.	x											yes
	(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.	x											yes
	(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.		x										
1.7.4.2.	Contents of the instructions												
	Each instruction manual must contain, where applicable, at least the following information:	x											yes
	(a) the business name and full address of the manufacturer and of his authorised representative;	x											yes
	(b) the designation of the machinery as marked on the machinery itself, except for the serial number (see section 1.7.3);	x											yes

	(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;	x											yes
	(d) a general description of the machinery;	x											yes
	(e) the drawings, diagrams, descriptions and explanations necessary for the use, maintenance and repair of the machinery and for checking its correct functioning;	x											yes
	(f) a description of the workstation(s) likely to be occupied by operators;	x		excisting operating instructions									yes
	(g) a description of the intended use of the machinery;	x											yes
	(h) warnings concerning ways in which the machinery must not be used that experience has shown might occur;	x											yes
	(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;	x											yes
	(j) instructions relating to installation and assembly for reducing noise or vibration;		x										
	(k) instructions for the putting into service and use of the machinery and, if necessary, instructions for the training of operators;	x											yes
	(l) information about the residual risks that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted;	x											yes
	(m) instructions on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided;	x											yes
	(n) the essential characteristics of tools which may be fitted to the machinery;	x											yes
	(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;	x										level and firm surface	yes
	(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;	x											yes

	(q) the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked;	x										service technician	yes
	(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;	x											yes
	(s) instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;	x											yes
	(t) the specifications of the spare parts to be used, when these affect the health and safety of operators;	x		specification of spare parts									yes
	(u) the following information on airborne noise emissions:	x		<70 dB(A)									yes
	— 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,	x											yes
	— the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa),		x										
	— the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).		x										
	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.	x											yes
	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.		x										
	Where the harmonised standards are not applied, sound levels must be measured using the most appropriate method for the machinery. Whenever sound emission values are indicated the uncertainties surrounding these values must be specified. The operating conditions of the machinery during measurement and the measuring methods used must be described.		x										
	Where the workstation(s) are undefined or cannot be defined, A-weighted sound pressure levels must be measured at a distance of 1 metre from the surface of the machinery and at a height of 1,6 metres from the floor or access platform. The position and value of the maximum sound pressure must be indicated.	x										details in operating instructions	yes

	Where specific Community Directives lay down other requirements for the measurement of sound pressure levels or sound power levels, those Directives must be applied and the corresponding provisions of this section shall not apply;		x										
	(v) where machinery is likely to emit non-ionising radiation which may cause harm to persons, in particular persons with active or non-active implantable medical devices, information concerning the radiation emitted for the operator and exposed persons.		x	no remote control									
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.	x											yes
2.	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS FOR CERTAIN CATEGORIES OF MACHINERY		x										
3.	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS TO OFFSET HAZARDS DUE TO THE MOBILITY OF MACHINERY												
	Machinery presenting hazards due to its mobility must meet all the essential health and safety requirements described in this chapter (see General Principles, point 4).												
3.1.	GENERAL												
3.1.1.	Definitions												
	(a) ‘Machinery presenting hazards due to its mobility’ means	x											
	— machinery the operation of which requires either mobility while working, or continuous or semicontinuous movement between a succession of fixed working locations, or	x		movable									
	— machinery which is operated without being moved, but which may be equipped in such a way as to enable it to be moved more easily from one place to another.		x										
	(b) ‘Driver’ means an operator responsible for the movement of a machine. The driver may be transported by the machinery or may be on foot, accompanying the machinery, or may guide the machinery by remote control.	x											
3.2.	WORK POSITIONS												
3.2.1.	Driving position		x										

	Visibility from the driving position must be such that the driver can, in complete safety for himself and the exposed persons, operate the machinery and its tools in their foreseeable conditions of use. Where necessary, appropriate devices must be provided to remedy hazards due to inadequate direct vision.		x										
	Machinery on which the driver is transported must be designed and constructed in such a way that, from the driving positions, there is no risk to the driver from inadvertent contact with the wheels and tracks.		x										
	The driving position of ride-on drivers must be designed and constructed in such a way that a driver's cab may be fitted, provided this does not increase the risk and there is room for it. The cab must incorporate a place for the instructions needed for the driver.		x										
3.2.2.	Seating		x										
	Where there is a risk that operators or other persons transported by the machinery may be crushed between parts of the machinery and the ground should the machinery roll or tip over, in particular for machinery equipped with a protective structure referred to in section 3.4.3 or 3.4.4, their seats must be designed or equipped with a restraint system so as to keep the persons in their seats, without restricting movements necessary for operations or movements relative to the structure caused by the suspension of the seats. Such restraint systems should not be fitted if they increase the risk.		x										
3.2.3.	Positions for other persons		x										
	If the conditions of use provide that persons other than the driver may occasionally or regularly be transported by the machinery or work on it, appropriate positions must be provided which enable them to be transported or to work on it without risk.		x										
	The second and third paragraphs of section 3.2.1 also apply to the places provided for persons other than the driver.		x										
3.3.	CONTROL SYSTEMS		x										
	If necessary, steps must be taken to prevent unauthorised use of controls.		x										
	In the case of remote controls, each control unit must clearly identify the machinery to be controlled from that unit.		x										
	The remote control system must be designed and constructed in such a way as to affect only:		x										
	— the machinery in question,		x										

	— the functions in question.		x										
	Remote controlled machinery must be designed and constructed in such a way that it will respond only to signals from the intended control units.		x										
3.3.1.	Control devices		x										
	The driver must be able to actuate all control devices required to operate the machinery from the driving position, except for functions which can be safely actuated only by using control devices located elsewhere. These functions include, in particular, those for which operators other than the driver are responsible or for which the driver has to leave the driving position in order to control them safely.		x										
	Where there are pedals, they must be so designed, constructed and fitted as to allow safe operation by the driver with the minimum risk of incorrect operation. They must have a slip-resistant surface and be easy to clean.		x										
	Where their operation can lead to hazards, notably dangerous movements, the control devices, except for those with preset positions, must return to the neutral position as soon as they are released by the operator.		x										
	In the case of wheeled machinery, the steering system must be designed and constructed in such a way as to reduce the force of sudden movements of the steering wheel or the steering lever caused by shocks to the guide wheels		x										
	Any control that locks the differential must be so designed and arranged that it allows the differential to be unlocked when the machinery is moving.		x										
	The sixth paragraph of section 1.2.2, concerning acoustic and/or visual warning signals, applies only in the case of reversing.		x										
3.3.2.	Starting/moving	x											
	All travel movements of self-propelled machinery with a ride-on driver must be possible only if the driver is at the controls.		x										
	Where, for operating purposes, machinery is fitted with devices which exceed its normal clearance zone (e.g. stabilisers, jib, etc.), the driver must be provided with the means of checking easily, before moving the machinery, that such devices are in a particular position which allows safe movement.	x		outrigger in operator`s / driver`s field of view								operating instructions	yes

	This also applies to all other parts which, to allow safe movement, have to be in particular positions, locked if necessary.		x										
	Where it does not give rise to other risks, movement of the machinery must depend on safe positioning of the aforementioned parts.		x										
	It must not be possible for unintentional movement of the machinery to occur while the engine is being started.		x										
3.3.3.	Travelling function	x											
	Without prejudice to road traffic regulations, self-propelled machinery and its trailers must meet the requirements for slowing down, stopping, braking and immobilisation so as to ensure safety under all the operating, load, speed, ground and gradient conditions allowed for.		x										
	The driver must be able to slow down and stop self-propelled machinery by means of a main device. Where safety so requires, in the event of a failure of the main device, or in the absence of the energy supply needed to actuate the main device, an emergency device with a fully independent and easily accessible control device must be provided for slowing down and stopping.		x										
	Where safety so requires, a parking device must be provided to render stationary machinery immobile. This device may be combined with one of the devices referred to in the second paragraph, provided that it is purely mechanical.	x		parking brake at back wheels									yes
	Remote-controlled machinery must be equipped with devices for stopping operation automatically and immediately and for preventing potentially dangerous operation in the following situations:		x										
	— if the driver loses control,		x										
	— if it receives a stop signal,		x										
	— if a fault is detected in a safety-related part of the system,		x										
	— if no validation signal is detected within a specified time.		x										
	Section 1.2.4 does not apply to the travelling function.		x										
3.3.4.	Movement of pedestrian-controlled machinery		x										
	Movement of pedestrian-controlled self-propelled machinery must be possible only through sustained action on the relevant control device by the driver. In particular, it must not be possible for movement to occur while the engine is being started.		x										

	The control systems for pedestrian-controlled machinery must be designed in such a way as to minimise the risks arising from inadvertent movement of the machine towards the driver, in particular:		x										
	— crushing,		x										
	— injury from rotating tools.												
	The speed of travel of the machinery must be compatible with the pace of a driver on foot.		x										
	In the case of machinery on which a rotary tool may be fitted, it must not be possible to actuate the tool when the reverse control is engaged, except where the movement of the machinery results from movement of the tool. In the latter case, the reversing speed must be such that it does not endanger the driver.		x										
3.3.5.	Control circuit failure		x										
	A failure in the power supply to the power-assisted steering, where fitted, must not prevent machinery from being steered during the time required to stop it.		x										
3.4.	PROTECTION AGAINST MECHANICAL HAZARDS												
3.4.1.	Uncontrolled movements												
	Machinery must be designed, constructed and where appropriate placed on its mobile support in such a way as to ensure that, when moved, uncontrolled oscillations of its centre of gravity do not affect its stability or exert excessive strain on its structure.	x										verification of stability	yes
3.4.2.	Moving transmission parts		x										
	By way of exception to section 1.3.8.1, in the case of engines, moveable guards preventing access to the moving parts in the engine compartment need not have interlocking devices if they have to be opened either by the use of a tool or key or by a control located in the driving position, providing the latter is in a fully enclosed cab with a lock to prevent unauthorised access.		x										
3.4.3.	Roll-over and tip-over		x										
	Where, in the case of self-propelled machinery with a ride-on driver, operator(s) or other person(s), there is a risk of rolling or tipping over, the machinery must be fitted with an appropriate protective structure, unless this increases the risk.		x										
	This structure must be such that in the event of rolling or tipping over it affords the ride-on person(s) an adequate deflection-limiting volume.		x										

	In order to verify that the structure complies with the requirement laid down in the second paragraph, the manufacturer or his authorised representative must, for each type of structure concerned, perform appropriate tests or have such tests performed.		x										
3.4.4.	Falling objects		x										
	Where, in the case of self-propelled machinery with a ride-on driver, operator(s) or other person(s), there is a risk due to falling objects or material, the machinery must be designed and constructed in such a way as to take account of this risk and fitted, if its size allows, with an appropriate protective structure.		x										
	This structure must be such that, in the event of falling objects or material, it guarantees the ride-on person(s) an adequate deflection-limiting volume.		x										
	In order to verify that the structure complies with the requirement laid down in the second paragraph, the manufacturer or his authorised representative must, for each type of structure concerned, perform appropriate tests or have such tests performed.		x										
3.4.5.	Means of access		x										
	Handholds and steps must be designed, constructed and arranged in such a way that the operators use them instinctively and do not use the control devices to assist access.		x										
3.4.6.	Towing devices		x										
	All machinery used to tow or to be towed must be fitted with towing or coupling devices designed, constructed and arranged in such a way as to ensure easy and secure connection and disconnection and to prevent accidental disconnection during use.		x										
	Insofar as the tow bar load so requires, such machinery must be equipped with a support with a bearing surface suited to the load and the ground.		x										
3.4.7.	Transmission of power between self-propelled machinery (or tractor) and recipient machinery		x										
	Removable mechanical transmission devices linking self-propelled machinery (or a tractor) to the first fixed bearing of recipient machinery must be designed and constructed in such a way that any part that moves during operation is protected over its whole length.		x										
	On the side of the self-propelled machinery (or tractor), the power take-off to which the removable mechanical transmission device is attached must be protected either by a guard fixed and linked to the self-propelled machinery (or tractor) or by any other device offering equivalent protection.		x										

	It must be possible to open this guard for access to the removable transmission device. Once it is in place, there must be enough room to prevent the drive shaft damaging the guard when the machinery (or the tractor) is moving.		x										
	On the recipient machinery side, the input shaft must be enclosed in a protective casing fixed to the machinery.		x										
	Torque limiters or freewheels may be fitted to universal joint transmissions only on the side adjoining the driven machinery. The removable mechanical transmission device must be marked accordingly.		x										
	All recipient machinery, the operation of which requires a removable mechanical transmission device to connect it to self-propelled machinery (or a tractor), must have a system for attaching the removable mechanical transmission device so that, when the machinery is uncoupled, the removable mechanical transmission device and its guard are not damaged by contact with the ground or part of the machinery.		x										
	The outside parts of the guard must be so designed, constructed and arranged that they cannot turn with the removable mechanical transmission device. The guard must cover the transmission to the ends of the inner jaws in the case of simple universal joints and at least to the centre of the outer joint or joints in the case of wide-angle universal joints.		x										
	If means of access to working positions are provided near to the removable mechanical transmission device, they must be designed and constructed in such a way that the shaft guards cannot be used as steps, unless designed and constructed for that purpose.		x										
3.5.	PROTECTION AGAINST OTHER HAZARDS												
3.5.1.	Batteries		x										
	The battery housing must be designed and constructed in such a way as to prevent the electrolyte being ejected on to the operator in the event of rollover or tipover and to avoid the accumulation of vapours in places occupied by operators.		x										
	Machinery must be designed and constructed in such a way that the battery can be disconnected with the aid of an easily accessible device provided for that purpose.		x										
3.5.2.	Fire		x										
	Depending on the hazards anticipated by the manufacturer, machinery must, where its size permits:		x										
	— either allow easily accessible fire extinguishers to be fitted, or		x										

	— be provided with built-in extinguisher systems.		x										
3.5.3.	Emissions of hazardous substances		x										
	The second and third paragraphs of section 1.5.13 do not apply where the main function of the machinery is the spraying of products. However, the operator must be protected against the risk of exposure to such hazardous emissions.		x										
3.6.	INFORMATION AND INDICATIONS		x										
3.6.1.	Signs, signals and warnings		x										
	All machinery must have signs and/or instruction plates concerning use, adjustment and maintenance, wherever necessary, so as to ensure the health and safety of persons. They must be chosen, designed and constructed in such a way as to be clearly visible and indelible.		x										
	Without prejudice to the provisions of road traffic regulations, machinery with a ride-on driver must have the following equipment:		x										
	— an acoustic warning device to alert persons,		x										
	— a system of light signals relevant to the intended conditions of use; the latter requirement does not apply to machinery intended solely for underground working and having no electrical power,		x										
	— where necessary, there must be an appropriate connection between a trailer and the machinery for the operation of signals.		x										
	Remote-controlled machinery which, under normal conditions of use, exposes persons to the risk of impact or crushing must be fitted with appropriate means to signal its movements or with means to protect persons against such risks. The same applies to machinery which involves, when in use, the constant repetition of a forward and backward movement on a single axis where the area to the rear of the machine is not directly visible to the driver.		x										
	Machinery must be constructed in such a way that the warning and signalling devices cannot be disabled unintentionally. Where it is essential for safety, such devices must be provided with the means to check that they are in good working order and their failure must be made apparent to the operator.		x										

	Where the movement of machinery or its tools is particularly hazardous, signs on the machinery must be provided to warn against approaching the machinery while it is working; the signs must be legible at a sufficient distance to ensure the safety of persons who have to be in the vicinity.		x										
3.6.2.	Marking		x										
	The following must be shown legibly and indelibly on all machinery:												
	— nominal power expressed in kilowatts (kW),												
	— mass of the most usual configuration, in kilograms (kg);												
	and, where appropriate:												
	— maximum drawbar pull provided for at the coupling hook, in Newtons (N),												
	— maximum vertical load provided for on the coupling hook, in Newtons (N).												
3.6.3.	Instructions												
3.6.3.1.	Vibrations		x										
	The instructions must give the following information concerning vibrations transmitted by the machinery to the hand-arm system or to the whole body:		x										
	— the vibration total value to which the hand-arm system is subjected, if it exceeds 2,5 m/s2. Where this value does not exceed 2,5 m/s2, this must be mentioned,		x										
	— the highest root mean square value of weighted acceleration to which the whole body is subjected, if it exceeds 0,5 m/s2. Where this value does not exceed 0,5 m/s2, this must be mentioned,		x										
	— the uncertainty of measurement.		x										
	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.		x										
	Where harmonised standards are not applied, the vibration must be measured using the most appropriate measurement code for the machinery concerned.		x										
	The operating conditions during measurement and the measurement codes used must be described.		x										
3.6.3.2.	Multiple uses		x										

	The instructions for machinery allowing several uses depending on the equipment used and the instructions for the interchangeable equipment must contain the information necessary for safe assembly and use of the basic machinery and the interchangeable equipment that can be fitted.		x										
4.	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS TO OFFSET HAZARDS DUE TO LIFTING OPERATIONS	x											
	Machinery presenting hazards due to lifting operations must meet all the relevant essential health and safety requirements described in this chapter (see General Principles, point 4).												
4.1.	GENERAL												
4.1.1.	Definitions												
	(a) 'Lifting operation' means a movement of unit loads consisting of goods and/or persons necessitating, at a given moment, a change of level.	x											
	(b) 'Guided load' means a load where the total movement is made along rigid or flexible guides whose position is determined by fixed points.	x											
	(c) 'Working coefficient' means the arithmetic ratio between the load guaranteed by the manufacturer or his authorised representative up to which a component is able to hold it and the maximum working load marked on the component.	x											
	(d) 'Test coefficient' means the arithmetic ratio between the load used to carry out the static or dynamic tests on lifting machinery or a lifting accessory and the maximum working load marked on the lifting machinery or lifting accessory.	x											
	(e) 'Static test' means the test during which lifting machinery or a lifting accessory is first inspected and subjected to a force corresponding to the maximum working load multiplied by the appropriate static test coefficient and then re-inspected once the said load has been released to ensure that no damage has occurred.	x		1,25-times of loading capacity DIN EN 13001-1								individual examination	
	(f) 'Dynamic test' means the test during which lifting machinery is operated in all its possible configurations at the maximum working load multiplied by the appropriate dynamic test coefficient with account being taken of the dynamic behaviour of the lifting machinery in order to check that it functions properly.	x		1,1-times of loading capacity according to DIN EN 13001-1									

	(g) ‘Carrier’ means a part of the machinery on or in which persons and/or goods are supported in order to be lifted.	x											
4.1.2.	Protection against mechanical hazards												
4.1.2.1.	Risks due to lack of stability												
	Machinery must be designed and constructed in such a way that the stability required by section 1.3.1 is maintained both in service and out of service, including all stages of transportation, assembly and dismantling, during foreseeable component failures and also during the tests carried out in accordance with the instruction handbook. To that end, the manufacturer or his authorised representative must use the appropriate verification methods	x		verification of stability									
4.1.2.2.	Machinery running on guide rails and rail tracks		x										
	Machinery must be provided with devices which act on the guide rails or tracks to prevent derailment.		x										
	If, despite such devices, there remains a risk of derailment or of failure of a rail or of a running component, devices must be provided which prevent the equipment, component or load from falling or the machinery from overturning.		x										
4.1.2.3.	Mechanical strength	x		strength									yes
	Machinery, lifting accessories and their components must be capable of withstanding the stresses to which they are subjected, both in and, where applicable, out of use, under the installation and operating conditions provided for and in all relevant configurations, with due regard, where appropriate, to the effects of atmospheric factors and forces exerted by persons. This requirement must also be satisfied during transport, assembly and dismantling.	x										overload test of each unit with 1,25-fold load, statical→ protocol	yes
	Machinery and lifting accessories must be designed and constructed in such a way as to prevent failure from fatigue and wear, taking due account of their intended use.	x											yes
	The materials used must be chosen on the basis of the intended working environments, with particular regard to corrosion, abrasion, impacts, extreme temperatures, fatigue, brittleness and ageing.	x											yes

	Machinery and lifting accessories must be designed and constructed in such a way as to withstand the overload in the static tests without permanent deformation or patent defect. Strength calculations must take account of the value of the static test coefficient chosen to guarantee an adequate level of safety. That coefficient has, as a general rule, the following values:	x		static overload test with 1,25-fold load									yes
	(a) manually-operated machinery and lifting accessories: 1,5;												
	(b) other machinery: 1,25.	x											
	Machinery must be designed and constructed in such a way as to undergo, without failure, the dynamic tests carried out using the maximum working load multiplied by the dynamic test coefficient. This dynamic test coefficient is chosen so as to guarantee an adequate level of safety: the coefficient is, as a general rule, equal to 1,1. As a general rule, the tests will be performed at the nominal speeds provided for. Should the control circuit of the machinery allow for a number of simultaneous movements, the tests must be carried out under the least favourable conditions, as a general rule by combining the movements concerned.	x		dynamic overload test with 1,1-fold load acceptance test									yes
4.1.2.4.	Pulleys, drums, wheels, ropes and chains		x										
	Pulleys, drums and wheels must have a diameter commensurate with the size of the ropes or chains with which they can be fitted.												
	Drums and wheels must be designed, constructed and installed in such a way that the ropes or chains with which they are equipped can be wound without coming off.												
	Ropes used directly for lifting or supporting the load must not include any splicing other than at their ends. Splicings are, however, tolerated in installations which are intended by design to be modified regularly according to needs of use.												
	Complete ropes and their endings must have a working coefficient chosen in such a way as to guarantee an adequate level of safety. As a general rule, this coefficient is equal to 5.												
	Lifting chains must have a working coefficient chosen in such a way as to guarantee an adequate level of safety. As a general rule, this coefficient is equal to 4.												

	In order to verify that an adequate working coefficient has been attained, the manufacturer or his authorised representative must, for each type of chain and rope used directly for lifting the load and for the rope ends, perform the appropriate tests or have such tests performed.												
4.1.2.5.	Lifting accessories and their components		x										
	Lifting accessories and their components must be sized with due regard to fatigue and ageing processes for a number of operating cycles consistent with their expected life-span as specified in the operating conditions for a given application.												
	Moreover:		x										
	(a) the working coefficient of wire-rope/rope-end combinations must be chosen in such a way as to guarantee an adequate level of safety; this coefficient is, as a general rule, equal to 5. Ropes must not comprise any splices or loops other than at their ends;		x										
	(b) where chains with welded links are used, they must be of the short-link type. The working coefficient of chains must be chosen in such a way as to guarantee an adequate level of safety; this coefficient is, as a general rule, equal to 4;		x										
	(c) the working coefficient for textile ropes or slings is dependent on the material, method of manufacture, dimensions and use. This coefficient must be chosen in such a way as to guarantee an adequate level of safety; it is, as a general rule, equal to 7, provided the materials used are shown to be of very good quality and the method of manufacture is appropriate to the intended use. Should this not be the case, the coefficient is, as a general rule, set at a higher level in order to secure an equivalent level of safety. Textile ropes and slings must not include any knots, connections or splicing other than at the ends of the sling, except in the case of an endless sling;		x										
	(d) all metallic components making up, or used with, a sling must have a working coefficient chosen in such a way as to guarantee an adequate level of safety; this coefficient is, as a general rule, equal to 4;		x										
	(e) the maximum working load of a multilegged sling is determined on the basis of the working coefficient of the weakest leg, the number of legs and a reduction factor which depends on the slinging configuration;		x										

	(f) in order to verify that an adequate working coefficient has been attained, the manufacturer or his authorised representative must, for each type of component referred to in (a), (b), (c) and (d), perform the appropriate tests or have such tests performed.		x										
4.1.2.6.	Control of movements												
	Devices for controlling movements must act in such a way that the machinery on which they are installed is kept safe.	x		hydraulic cylinder extension arm									yes
	(a) Machinery must be designed and constructed or fitted with devices in such a way that the amplitude of movement of its components is kept within the specified limits. The operation of such devices must, where appropriate, be preceded by a warning.	x		hydraulic cylinder extension arm									yes
	(b) Where several fixed or rail-mounted machines can be manoeuvred simultaneously in the same place, with risks of collision, such machinery must be designed and constructed in such a way as to make it possible to fit systems enabling these risks to be avoided.												
	(c) Machinery must be designed and constructed in such a way that the loads cannot creep dangerously or fall freely and unexpectedly, even in the event of partial or total failure of the power supply or when the operator stops operating the machine.	x											yes
	(d) It must not be possible, under normal operating conditions, to lower the load solely by friction brake, except in the case of machinery whose function requires it to operate in that way.	x											yes
	(e) Holding devices must be designed and constructed in such a way that inadvertent dropping of the loads is avoided.	x											yes
4.1.2.7.	Movements of loads during handling												
	The operating position of machinery must be located in such a way as to ensure the widest possible view of trajectories of the moving parts, in order to avoid possible collisions with persons, equipment or other machinery which might be manoeuvring at the same time and liable to constitute a hazard.	x											
	Machinery with guided loads must be designed and constructed in such a way as to prevent persons from being injured by movement of the load, the carrier or the counterweights, if any.	x											
4.1.2.8.	Machinery serving fixed landings		x										

4.1.2.8.1.	Movements of the carrier		x										
	The movement of the carrier of machinery serving fixed landings must be rigidly guided to and at the landings. Scissor systems are also regarded as rigid guidance.		x										
4.1.2.8.2.	Access to the carrier		x										
	Where persons have access to the carrier, the machinery must be designed and constructed in such a way as to ensure that the carrier remains stationary during access, in particular while it is being loaded or unloaded.		x										
	The machinery must be designed and constructed in such a way as to ensure that the difference in level between the carrier and the landing being served does not create a risk of tripping.		x										
4.1.2.8.3.	Risks due to contact with the moving carrier		x										
	Where necessary in order to fulfil the requirement expressed in the second paragraph of section 4.1.2.7, the travel zone must be rendered inaccessible during normal operation.		x										
	When, during inspection or maintenance, there is a risk that persons situated under or above the carrier may be crushed between the carrier and any fixed parts, sufficient free space must be provided either by means of physical refuges or by means of mechanical devices blocking the movement of the carrier.		x										
4.1.2.8.4.	Risk due to the load falling off the carrier		x										
	Where there is a risk due to the load falling off the carrier, the machinery must be designed and constructed in such a way as to prevent this risk.		x										
4.1.2.8.5.	Landings		x										
	Risks due to contact of persons at landings with the moving carrier or other moving parts must be prevented.		x										
	Where there is a risk due to persons falling into the travel zone when the carrier is not present at the landings, guards must be fitted in order to prevent this risk. Such guards must not open in the direction of the travel zone. They must be fitted with an interlocking device controlled by the position of the carrier that prevents:		x										
	— hazardous movements of the carrier until the guards are closed and locked,		x										
	— hazardous opening of a guard until the carrier has stopped at the corresponding landing.		x										

4.1.3.	Fitness for purpose												
	When lifting machinery or lifting accessories are placed on the market or are first put into service, the manufacturer or his authorised representative must ensure, by taking appropriate measures or having them taken, that the machinery or the lifting accessories which are ready for use — whether manually or power-operated — can fulfil their specified functions safely.	x										production log and load test with 1,25-fold load , verification record included	yes
	The static and dynamic tests referred to in section 4.1.2.3 must be performed on all lifting machinery ready to be put into service.	x										test report	yes
	Where the machinery cannot be assembled in the manufacturer's premises or in the premises of his authorised representative, the appropriate measures must be taken at the place of use. Otherwise, the measures may be taken either in the manufacturer's premises or at the place of use.	x										attention to assembly and operating instructions	yes
4.2.	REQUIREMENTS FOR MACHINERY WHOSE POWER SOURCE IS OTHER THAN MANUAL EFFORT												
4.2.1.	Control of movements		x										
	Hold-to-run control devices must be used to control the movements of the machinery or its equipment. However, for partial or complete movements in which there is no risk of the load or the machinery colliding, the said devices may be replaced by control devices authorising automatic stops at pre-selected positions without the operator holding a hold-to-run control device.												
4.2.2.	Loading control												
	Machinery with a maximum working load of not less than 1 000 kilograms or an overturning moment of not less than 40 000 Nm must be fitted with devices to warn the driver and prevent dangerous movements in the event:		x								check tilting moment	check of tilting moment not necessary because sustainability ≤ 1000 kg	yes
	— of overloading, either as a result of the maximum working load or the maximum working moment due to the load being exceeded, or		x										
	— of the overturning moment being exceeded.		x										
4.2.3.	Installations guided by ropes		x										
	Rope carriers, tractors or tractor carriers must be held by counterweights or by a device allowing permanent control of the tension.												
4.3.	INFORMATION AND MARKINGS												
4.3.1.	Chains, ropes and webbing												

	Each length of lifting chain, rope or webbing not forming part of an assembly must bear a mark or, where this is not possible, a plate or irremovable ring bearing the name and address of the manufacturer or his authorised representative and the identifying reference of the relevant certificate.		x										
	The certificate mentioned above must show at least the following information:		x										
	(a) the name and address of the manufacturer and, if appropriate, his authorised representative;		x										
	(b) a description of the chain or rope which includes:		x										
	— its nominal size,		x										
	— its construction,		x										
	— the material from which it is made, and		x										
	— any special metallurgical treatment applied to the material;		x										
	(c) the test method used;		x										
	(d) the maximum load to which the chain or rope should be subjected in service. A range of values may be given on the basis of the intended applications.		x										
4.3.2.	Lifting accessories		x	DIN EN 13155								not subjet of test program MFC	
	Lifting accessories must show the following particulars:		x										
	— identification of the material where this information is needed for safe use,		x										
	— the maximum working load.		x										
	In the case of lifting accessories on which marking is physically impossible, the particulars referred to in the first paragraph must be displayed on a plate or other equivalent means and securely affixed to the accessory.		x										
	The particulars must be legible and located in a place where they are not liable to disappear as a result of wear or jeopardise the strength of the accessory.		x										
4.3.3.	Lifting machinery												
	The maximum working load must be prominently marked on the machinery. This marking must be legible, indelible and in an un-coded form.	x									at machine and lifting accessories		yes

	Where the maximum working load depends on the configuration of the machinery, each operating position must be provided with a load plate indicating, preferably in diagrammatic form or by means of tables, the working load permitted for each configuration.		x										
	Machinery intended for lifting goods only, equipped with a carrier which allows access to persons, must bear a clear and indelible warning prohibiting the lifting of persons. This warning must be visible at each place where access is possible.	x									pictograms		yes
4.4.	INSTRUCTIONS		x										
4.4.1.	Lifting accessories		x										
	Each lifting accessory or each commercially indivisible batch of lifting accessories must be accompanied by instructions setting out at least the following particulars:												
	(a) the intended use;		x										
	(b) the limits of use (particularly for lifting accessories such as magnetic or vacuum pads which do not fully comply with section 4.1.2.6(e));		x										
	(c) instructions for assembly, use and maintenance;		x										
	(d) the static test coefficient used.		x										
4.4.2.	Lifting machinery	x											
	Lifting machinery must be accompanied by instructions containing information on:	x											yes
	(a) the technical characteristics of the machinery, and in particular:	x											yes
	— the maximum working load and, where appropriate, a copy of the load plate or load table described in the second paragraph of section 4.3.3,	x											yes
	— the reactions at the supports or anchors and, where appropriate, characteristics of the tracks,	x									vertical wheel forces (surface pressure)		yes
	— where appropriate, the definition and the means of installation of the ballast;	x									use always all counterweights		yes
	(b) the contents of the logbook, if the latter is not supplied with the machinery;	x									inspection book		yes
	(c) advice for use, particularly to offset the lack of direct vision of the load by the operator;		x										

	(d) where appropriate, a test report detailing the static and dynamic tests carried out by or for the manufacturer or his authorised representative;	x										load test with 1,25-fold load	yes
	(e) for machinery which is not assembled on the premises of the manufacturer in the form in which it is to be used, the necessary instructions for performing the measures referred to in section 4.1.3 before it is first put into service.	x									ready-to-use delivery from manufacturer		yes
5.	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS FOR MACHINERY INTENDED FOR UNDERGROUND WORK		x										
6.	SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS FOR MACHINERY PRESENTING PARTICULAR HAZARDS DUE TO THE LIFTING OF PERSONS		x										