Prüfbericht-Nr.: *Test report no.*:	**CN2310PP 002 Part I of II**	**Auftrags-Nr.:** *Order no.*:	170351850 470	
Kunden-Referenz-Nr.: *Client reference no.*:	2533689	**Auftragsdatum:** *Order date:*	2023-09-05	
Auftraggeber: *Client*:	SHANDONG RIPPA MACHINERY GROUP CO., LTD. The norht of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, Shandong 272000, P.R. China			
Prüfgegenstand: *Test item*:	Hydraulic Excavator			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	R10, R13, R15, R18, R327			
Auftrags-Inhalt: *Order content*:	Type test			
Prüfgrundlage: *Test specification*:	EN 474-1:2022 *Earth-moving machinery - Safety - Part 1: General requirements*			

Wareneingangsdatum: *Date of sample receipt*:	2025-04-25
Prüfmuster-Nr.: *Test sample no:*	Engineering samples
Prüfzeitraum: *Testing period*:	2025-04-25 - 2025-04-25
Ort der Prüfung: *Place of testing*:	As client
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland (Guangdong) Ltd.
Prüfergebnis*: *Test result**:	Pass

geprüft von: tested by:	X Billy Shen 2025.05.22 09:26:29 +08'00'	**genehmigt von:** *authorized by*:	X Senmo He 2025.05.22 14:34:18 +08'00'
Datum: *Date:*		**Ausstellungsdatum:** *Issue date:*	
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other*:
This report is to add the corrigendum standard EN 474-5:2022/AC:2022.
This report is to change the manufacturer address, refer to page 4 for details.
This report is to change the type number, refer to page 4 for details.
This report is only valid together with CN2310PP 001.
This report is only valid in its full version including Part I of II and part II of II.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. *The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
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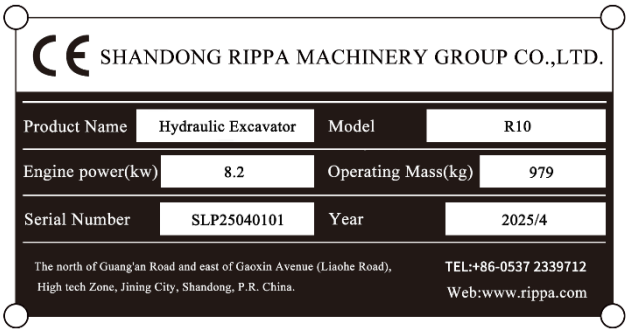
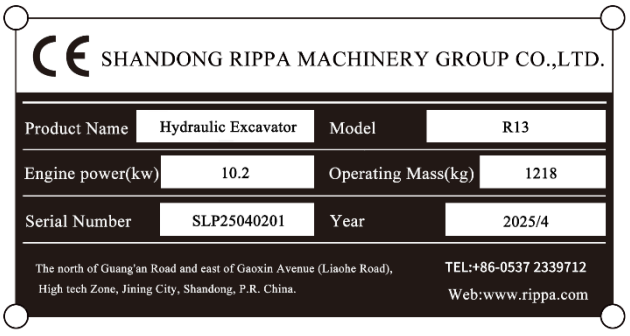
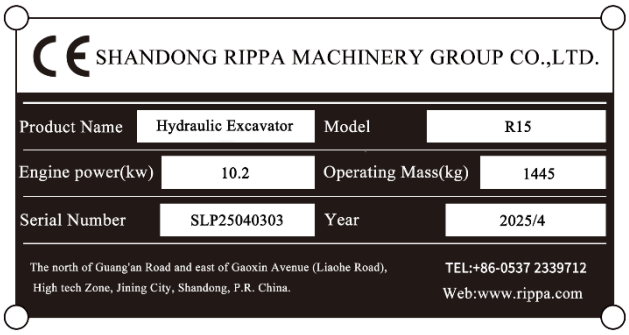
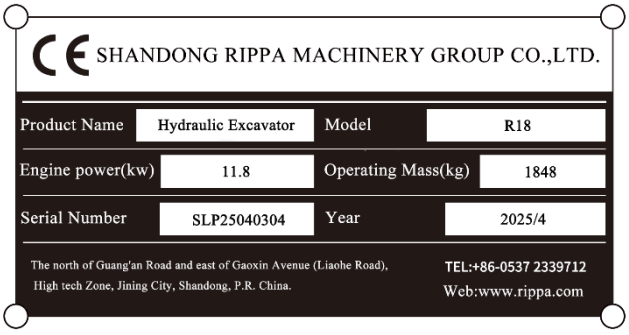
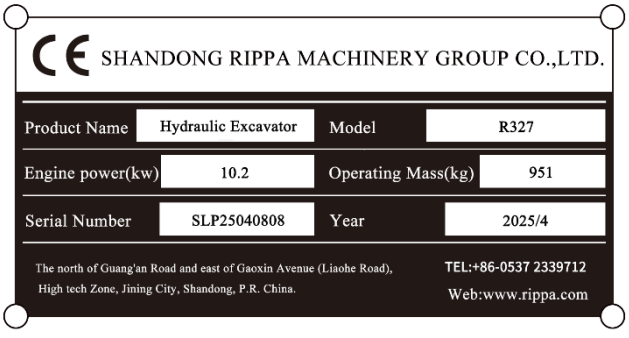
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. *The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.*

Produktbeschreibung
Product description

1	**Produktdetails** *Product details*	Hydraulic Excavator (Crawler type)
2	**Maße / Gewicht** *Dimensions / Weight*	Refer to page 6 for details
3	**Bedienelemente** *Operating elements*	Refer to page 6 for details
4	**Ausstattung / Zubehör** *Equipment / Accessories*	Bucket application
5	**Verwendete Materialien** *Used materials*	Diesel engine
6	**Sonstiges** *Other*	--
7	**Prüfmusterbereitstellung**: *Test sample obtaining*	☐ Sending by customer ☐ Sampling by TÜV Rheinland Group ☒ others: provided by client at manufacturer plant

R10	R10
	
R13	R13
	

Produktbeschreibung
Product description

R15	R15
	
R18	**R18**
	
R327	**R327**
	

Produktbeschreibung
Product description

General Information:

License holder	:	SHANDONG RIPPA MACHINERY GROUP CO., LTD. The norht of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, Shandong 272000, P.R. China
Manufacturer	:	SHANDONG RIPPA MACHINERY GROUP CO., LTD. The norht of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, Shandong 272000, P.R. China
Manufacturing plant (Test location)	:	SHANDONG RIPPA MACHINERY GROUP CO., LTD. The norht of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, Shandong 272000, P.R. China

This report is to change the manufacturer address from "No. 6 Industrial Park, No. 2166 Chongwen Avenue, High tech Zone, Jining City, Shandong Province, P.R. China" to "The norht of Guang'an Road and east of Gaoxin Avenue (Liaohe Road), High tech Zone, Jining City, Shandong 272000, P.R. China".

This report is to change the type number from NDI322 to R15. The new new model R15 is sames as the original certified model NDI322 except for the model name. Construction check was performed, no additional test.

This report is to change the type number from NDI335 to R18. The new new model R18 are sames as the original certified model NDI335 except for the model name. Construction check was performed, no additional test.

This report is to add alterative engine D722-EF18 for original certified model R327. Noise test was performed, no additional test.

This repor is to add the new models R10 and R13.

For more information, refers to specifications on page 6.

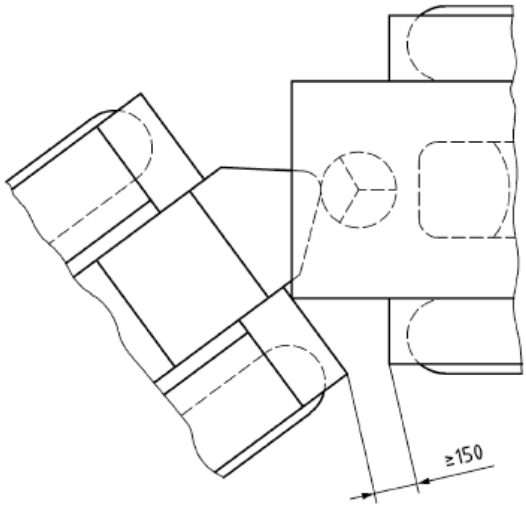
Produktbeschreibung
Product description

Specifications:

Model	R10	R13	R15
Serial No.	SLP25040101	SLP25040201	SLP25040303
Operation mass	979 kg	1218 kg	1445 kg
Overall dimension (L*W*H) mm	2244*917*2209	2114*990*2289	2243*1100*2327
Bucket	0.014 m^3	0.014 m^3	0.018 m^3
Battery operated	12VDC	12VDC	12VDC
Engine type	Z482-EF04	D722-EF18	D722-EF18
Engine manufacturer	Kubota	Kubota	Kubota
Engine power	8.2 kW	10.2 kW	10.2 kW
Engine speed	3000 /min	2500 /min	2500 /min

Model	R18	R327	-
Serial No.	SLP25040304	SLP25040808	-
Operation mass	1848 kg	951 kg	-
Overall dimension (L*W*H) mm	2403*989*2322	2313*1067*2243	-
Bucket	0.045 m^3	0.014 m^3	-
Battery operated	12VDC	12VDC	-
Engine type	D902-EF08	D722-EF18	-
Engine manufacturer	Kubota	Kubota	-
Engine power	11.8 kW	10.2 kW	-
Engine speed	2300 /min	2500 /min	-

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
1	Scope		P
	This document specifies the general safety requirements for earth-moving machinery, hereinafter also referred to as machines, described in EN ISO 6165:2012, except horizontal directional drills. This document gives the common safety requirements for earth-moving machinery families (see EN ISO 6165:2012, 3.4) and is intended to be used in conjunction with relevant parts of EN 474-2 to EN 474-13. These machine specific parts (EN 474-2 to EN 474−13) do not repeat the requirements from EN 474-1:2022 but supplement or modify the requirements for the family in question. This document does not provide requirements for main electrical circuits and drives of machinery when the primary source of energy is an external electrical supply. This document does not provide performance requirements for safety related functions of control system(s). This document does not deal with towing of trailers. This document does not deal with demolition machinery. This document deals with significant hazards, hazardous situations and events relevant to earth-moving machinery, when used as intended and under conditions foreseen but also taking into account any reasonably foreseeable misuse thereof (see Annex A). The following significant and relevant hazards are not covered in this document: — Laser; — Lightning. This document specifies the appropriate technical measures to reduce risks arising from the significant hazards, hazardous situations and events during the whole foreseeable lifecycle of the machinery as described in EN ISO 12100:2010, 5.4. This document is not applicable to earth-moving machinery which are manufactured before the date of publication of this document by CEN.		P
2	Normative references	Information	-
3	Terms and definitions	Information	-

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4	Safety requirements and/or protective/risk reduction measures		P
4.1	General		P
	Earth-moving machinery shall comply with the safety requirements and/or protective/risk reduction measures of this clause, unless modified by requirements of the relevant specific part of the standard series. In addition, the machine shall be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document.	The machine is designed in accordance with the principles of EN ISO 12100.	P
4.2	Access		P
4.2.1	General requirements		P
	Access systems shall be provided to the operator's station and to routine maintenance points. Access systems shall comply with EN ISO 2867:2011.	The access system is designed in accordance with EN ISO 2867:2011.	P
4.2.2	Access to articulated machines		N/A
	On machines with articulated frames and in the fully articulated steering position, a minimum clearance of 150 mm for the lower limbs shall be provided between firm structures and components with relative movement in the path of the access systems to the operator's station, as illustrated in Figure 1.	No such construction	N/A
	 Figure 1 - Minimum clearance of lower limbs at access to the operator's station on machines with articulated steering		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4.3	Operator's station		P
4.3.1	General requirements		P
4.3.1.1	Machinery equipment		P
	The operator’s station of seated ride-on machines shall be fitted with a cab. This requirement does not apply to compact machines. If the machine is intended for use in unhealthy environments, e.g. contaminated areas, this machine shall be equipped with a cab and a contamination protective system.	Compact machines A ride-on driving position is provided. Machine is not intended for used in unhealthy areas, and no cab is fitted.	P
4.3.1.2	Minimum space		P
	The minimum space available to the operator at the operator’s station shall be as defined in EN ISO 3411:2007 except the following amendments: — the minimum space envelope height (dimension R1 in EN ISO 3411:2007, Table 1, and measured from the seat index point (SIP), as defined in EN ISO 5353:1998), may be reduced to 920 mm for compact machines and 1 000 mm for all other machines. The minimum dimensions given are also required for machines having a front or rear window which are located (in an opened position) above the operator's seat; — for compact machines the minimum space envelope width at the operator’s station (dimension 920 mm in EN ISO 3411:2007, Figure 4) may be reduced to 650 mm.	Compact machines The minimum space envelope complied with ISO 3411. Technical files are provided and checked.	P
	The minimum space and location of the controls at the operator's station shall meet the requirements specified in EN ISO 6682:2008.	Compact machines The location of the controls complied with ISO 6682. Technical files are provided and checked.	P
4.3.1.3	Moving parts		P
	The machine shall be designed so as to avoid accidental contact from the operating position with moving parts, e.g. the wheels, tracks, working equipment or attachment in accordance with relevant subclauses of 4.14.	There is no moving part accessible from the operating position inside the operator’s cab.	P
4.3.1.4	Engine exhaust		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The engine exhaust system shall release the exhaust gas away from the operator and the air inlet of the cab.	The exhaust gas was released to the rear side of the machine so that it is away from the operator and air inlet of the cab.	P
4.3.1.5	Sharp edges		P
	The operator's station shall be free of sharp edges or acute angles/corners. Radius of corners and bluntness of edges shall comply with ISO 12508:1994 to avoid sharp edges (see also 4.14.3).	No sharp edges found by practical inspection.	P
4.3.2	Operator's station equipped with a cab	No cab is fitted.	N/A
4.3.2.1	Climatic conditions		N/A
4.3.2.1.1	General		N/A
	The cab shall protect the operator against foreseeable adverse climatic conditions. The cab shall be equipped with a ventilation system, an adjustable heating system and a system for defrosting windows.		N/A
	If an air-condition system is installed it shall comply with ISO 10263-4:2009.		N/A
4.3.2.1.2	Heating system		N/A
	A heating system shall comply with ISO 10263-4:2009.		N/A
4.3.2.1.3	Ventilation system		N/A
	The ventilation system shall be capable of providing the cab with filtered fresh air at the minimum of 43 m3/h. The filter shall be tested according to ISO 10263-2:2009.		N/A
4.3.2.1.4	Defrosting system		N/A
	The defrosting system shall be capable of defrosting the front windscreen and rear window to meet the visibility requirements of 4.8.1, for example by means of a heating system or a particular defrosting device.		N/A
	The defrosting system for the front windscreen shall meet the requirements specified in ISO 10263-5:2009.		N/A
	When visibility through the rear window is necessary to meet the requirements of 4.8.1, test procedures according to ISO 10263-5:2009 apply.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4.3.2.2	Pipes and hoses		N/A
	Pipes and hoses that contain fluids at pressures exceeding 5 MPa or temperatures above 60 °C located inside the cab shall be guarded in accordance with EN ISO 3457:2008, Clause 9. See also 4.18.		N/A
	Fixed parts or components of the machine placed between pipes or hoses and the operator which divert a hazardous spray of fluid, are sufficient protection devices.		N/A
4.3.2.3	Alternative opening (emergency exit)		N/A
	An alternative opening shall be provided on a side other than that of the primary opening. The dimensions shall comply with EN ISO 2867:2011, Clause 5. A window panel or another door is acceptable if they are easy to open or remove without the use of keys or tools. Latches may be used if they can be opened from the inside without the use of keys or tools.		N/A
	If the alternative opening is provided by the breaking of a glass panel, then a device for breaking the glass shall be fixed in a location adjacent to the relevant pane.		N/A
	The alternative opening shall be marked in accordance with EN ISO 7010:2020 Table 2, symbol E001 or E002.		N/A
4.3.2.4	Pressurization system		N/A
	Where a cab is provided with a pressurization system, it shall be tested according to ISO 10263-3:2009 and shall be capable of providing an interior relative pressure of at least 50 Pa.		N/A
4.3.2.5	Doors and windows		N/A
	Doors, windows and flaps shall be securely held in their intended operating positions. Doors shall be secured in accordance with EN ISO 2867:2011, 5.6.		N/A
	A primary opening designed to be held securely open as an intended operating position shall be releasable from inside the operator's cab.		N/A
	All windows shall be made of safety glass or any other material or arrangement providing equivalent protection to UN ECE R43.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Windows where the risk of breakage from objects or projectiles is present shall have a performance of UN ECE R43 Annex 4 as amended by Annex 9 as a minimum requirements or arrangement providing equivalent protection.		N/A
	The front window shall be fitted with motorised windscreen wiper(s) and washer(s). Rear window shall be equipped with motorised windscreen wiper(s) and washer(s) if direct or indirect visibility in this direction is required to comply with 4.8.1.		N/A
	The filling point of the window washer(s) tank shall be easily accessible in accordance with EN ISO 2867.		N/A
4.3.2.6	Inner lighting		N/A
	The cab shall be fitted with a fixed inner lighting system and be able to function with the engine at a stop, to make it possible to illuminate the operator's station and to read the operator’s manual in darkness.		N/A
4.3.3	Roll-over protective structures (ROPS)		P
	Earth-moving machinery with a seated ride-on operator shall be fitted with a roll-over protective structure (ROPS), complying with EN ISO 3471:2008.	Modified by EN 474-5, refers to Part II for details.	P
	EN ISO 3164:2013 applies for deflection limiting volume (DLV).		P
4.3.4	Falling-object protective structures (FOPS)		P
	Earth-moving machinery with a seated ride-on operator shall be fitted with a FOPS, complying with EN ISO 3449:2008.	Modified by EN 474-5, refers to Part II for details.	P
4.3.5	Movable operator's station		N/A
	For operator’s stations that are intended to be movable with the operator at the operator's station the requirements of Annex B shall apply.	No movable operator’s station	N/A
4.4	Seat		P
4.4.1	Operator's seat		P
4.4.1.1	General requirement		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Machinery with provision for a seated operator shall be fitted with an adjustable seat that supports the operator in a position which allows the operator to control the machine under intended operating conditions.	An adjustable seat is provided.	P
4.4.1.2	Dimensions		P
	The seat dimensions shall comply with ISO 11112:1995 and ISO 11112:1995/AMD 1:2001.	The seat dimensions are in accordance with ISO11112. Technical files are provided and checked.	P
4.4.1.3	Adjustment		P
	All adjustments to accommodate the operator's size shall comply with ISO 11112:1995 and ISO 11112:1995/AMD 1:2001, Table 1, except vertical adjustment (Table 1, h1) where a minimum value of 60 mm shall be used. The adjustment shall be possible without the use of any tool.	The adjustment is possible without the use of any tool. Modified by EN 474-5, refers to Part II for details.	P
	A suspension system shall be adjustable to the operator’s mass in accordance with EN ISO 3411:2007, Figure 1, small and large operator.	No suspension seat used	N/A
4.4.1.4	Vibration		P
	The operator's seat shall meet the requirements of EN ISO 7096:2020 with regard to its ability to reduce the vibration transmitted to the operator. NOTE Comparative data for vibration can be found in ISO/TR 25398:2006.	Modified by EN 474-5, refers to Part II for details.	P
4.4.1.5	Restrain system		P
	Machines fitted with ROPS shall have an operator restraint system that meets the requirements specified in EN ISO 6683:2008.	The restrain system meets the requirement of EN ISO 6683. Technical files are provided and checked.	P
4.4.2	Additional seat	No additional seat	N/A
4.4.2.1	Trainer seat		N/A
	Trainer seat shall comply with ISO 13459:2012.		N/A
4.4.2.2	Additional operator's seat		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	If an additional operator's seat is provided, this seat shall fulfil the requirements for seats as specified in 4.4 and the safety structures as specified in 4.3.3 (ROPS) and 4.3.4 (FOPS).		N/A
4.5	Operator’s controls and indicators		P
4.5.1	General		P
	The controls (hand levers, pedals, switches etc.) and indicators of the machine, equipment, attachment, shall be chosen, designed, constructed and arranged according to ISO 10968:2020, so that: a) access to controls and indicators shall be designed in accordance with EN ISO 6682:2008 and ISO 10968:2020; b) neutral positions of controls shall be in accordance with ISO 10968:2020, 5.1.4; c) they are clearly identified (see ISO 6405-1:20171 and ISO 6405-2:20172) in the operator's station and explained in the operator’s manual (see 6.3); d) the movement of the controls to activate the functions and indicators shall correspond to the intended effect or common practice whenever possible; e) an engine stop device shall be within the zone of reach in accordance with EN ISO 6682:2008; f) when a control is designed and constructed to carry out several functions of the machine, e.g. keyboard or joystick control, the activated function shall be clearly identified.	The controls are easily accessed from the operator position. All the controls can be returned to the neutral position. The controls clearly identified with their functional symbols. The controls correspond to the effect of the movement. Engine stop switch is easily access from the operator position. The activated function of joysticks is clearly identified.	P
	Where there is more than one control position the control system shall be designed in such a way that the use of one of them precludes the use of the other(s), except for stop controls.	Only one operator’s position is provided.	N/A
4.5.2	Starting/stopping system		P
	The starting/stopping system of earth-moving machinery shall be provided with a starting/stopping device (e.g. key, button) and have a protection against unauthorized use that at least complies with ISO 10264:1990.	The starting system of the machine is provided with a key ignition switch.	P
	Earth-moving machinery shall be so designed that hazardous movement of the machine or its working equipment and attachment shall not be possible without action on the controls whilst starting/stopping the engine.	Inspected and OK	P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4.5.3	Inadvertent activation		P
	Controls which can cause a hazard due to inadvertent activation shall be arranged, deactivated or guarded to minimize the risk when the operator gets into or out of the operator's station. Any deactivation system shall: a) be designed such that the risk of inadvertent reactivation of the controls (e.g. through a control being caught by clothing, being used instead of a hand-hold, being mistaken for another control) is minimized and; b) either be self-acting or acting by compulsory actuation of the relevant device.	A hydraulic pilot switch is provided. All the movement cannot be operated when the pilot is switched off, this can minimize the risk when the operator gets into or out of the operator's position.	P
4.5.4	Pedals		P
	Pedals shall have an appropriate size, shape and be adequately spaced. The pedals shall have a slip-resistant surface and be easy to clean.	Pedals are an appropriate size, shape and are adequately spaced. The pedals have a slip-resistant surface and are easy to clean.	P
	If the pedals of an earth-moving machine have the same function (clutch, brake, and accelerator) as on a motor vehicle, they shall be arranged in the same manner to avoid the risk of confusion.	The pedal design is not the same as motor vehicle.	P
4.5.5	Emergency attachment lowering		P
	If the engine is stopped it shall be possible to: a) lower the attachment to the ground/frame; b) see the attachment lowering from the operator actuating position of the lowering control; c) release the residual pressure in the hydraulic and pneumatic circuits.	If the engine is stopped, it is possible to lower the attachment to the ground by joystick with electric power ON.	P
	The means to lower the attachment and the device to release the residual pressure can be located outside the operator's station.		P
4.5.6	Uncontrolled motion		P
	Machine and equipment or attachment movement from the holding position, other than by actuation of the controls by the operator, due to drift or creep (e.g. by leaking) or when power supply stops, shall be limited to the extent that it cannot create a risk to exposed persons.	Inspected and OK	P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4.5.7	Remote control		N/A
	Remote controlled earth-moving machinery shall comply with the requirements as specified in ISO 15817:2012.	No remote control	N/A
4.5.8	Control panels, indicators and symbols		P
4.5.8.1	Control panels		P
	The operator shall be able to see from the operator's station, in both daylight and darkness, the necessary indicators to check the proper function of the machine. Glare shall be minimized.		P
4.5.8.2	Operating instrumentation		P
	Control indicators for operation of the machine, shall comply with ISO 6011:2003.	Inspected and OK	P
4.5.8.3	Symbols		P
	Symbols for use on operator controls and other displays on earth-moving machinery shall follow ISO 6405-1:20171 and ISO 6405-2:20172.	Symbols required in ISO 6405-1 and ISO 6405-2 provided.	P
4.5.9	Controls of ride-on machinery accessible from ground level		P
	Ride-on machine controls that are not intended to be operated from the ground shall have means to minimize the possibility of actuating the controls from the ground (e.g. protection by physical barrier, interlocking systems).	A hydraulic pilot switch is provided. All the movement cannot be operated when the pilot is switched off, this can minimize the risk of actuating the controls from the ground.	P
4.5.10	Controls of non-riding machinery		N/A
	Non-riding machines shall be equipped with a hold-to-run device to stop machine travel and hazardous tool movement if the operator releases the operator's controls.	Ride-on machine	N/A
4.6	Steering system		P
4.6.1	General		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The steering system shall be such that the movement of the steering control shall correspond to the intended direction of steering of the machine in accordance with ISO 10968:2020.	The steering control corresponds to the intended direction of steering in travel mode.	P
4.6.2	Wheeled machines		N/A
	Steering system of wheeled machinery shall comply with EN ISO 5010:2019.	Crawler machines	N/A
4.6.3	Crawler machines		N/A
	Steering system of crawler machines with a forward/reverse travel speed greater than 20 km/h shall be gradual.	The travel speed is less than 20 km/h.	N/A
4.7	Brake systems for travelling		P
4.7.1	General		P
	Earth-moving machines shall be equipped with service brake system, secondary brake system and parking brake system, efficient under all conditions of service, load, speed, terrain and slope, according to the intended use of the machine.		P
4.7.2	Brake systems for ride-on machines		P
	Brake systems for wheeled machines shall comply with EN ISO 3450:2011.	Crawler machines	N/A
	Brake systems for crawler machines shall comply with ISO 10265:2008.	Tested and OK	P
4.7.3	Brake systems for non-riding machines		N/A
	Brake systems for non-riding machines shall comply with ISO 17063:2003.	Ride-on machine	N/A
4.8	Visibility		P
4.8.1	Operator's field of view		P
	Earth-moving machinery shall be designed so that the operator has sufficient visibility from the operator's station in relation to the travel and work areas of the machine.		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The performance criteria for ride-on earth moving machinery with seated-operator shall be in accordance with ISO 5006:2017.	Tested and OK	P
	Earth-moving machinery shall be equipped with rear view mirrors or closed circuit television (CCTV) in accordance with ISO 14401-2:2009.	Tested and OK	P
	For machines equipped with a cab, means (e.g. sun visor, tinted glass) shall be provided to reduce glare through the front and, if relevant, through the rear windows (e.g. backhoe loader).	No cab is fitted.	N/A
4.8.2	Lighting, signalling and marking lights, and reflex-reflector devices		P
	Work lights and reflex-reflector devices shall be provided and shall comply with ISO 12509:2004. Lighting, signalling and marking lights, if provided, shall comply with ISO 12509:2004. The requirement for work lights is not applicable to non-riding machines with an operating mass ≤ 1500kg.	Working lamps and rear reflex reflectors are provided according to ISO 12509.	P
4.9	Forward horns and machine safety labels		P
	Earth-moving machinery shall be equipped with: — forward horns that comply with ISO 9533:2010 with a minimum A-weighed sound pressure level of 93 dB measured at Test Measurement Location 8. The requirement for forward horn is not applicable to non-riding compact machines; — machine safety labels according to 6.2.	An audible warning device (horn) controlled from the operator's station is provided and the A-weighed sound pressure level of which is greater than 93 dB. Safety labels are provided.	P
4.10	Tyres and rims	Crawler machines	N/A
	Rubber-tyred earth-moving machinery shall have tyre and rim load performance suitable for the purpose and application.		N/A
	Rims shall have clear identification, e.g. see ISO 4250-3:2011.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Machines with ballasted tyres shall have a machine safety label (see Figure 2), in accordance with 6.2.  Figure 2 - Example of machine safety label for ballasted tyres		N/A
4.11	Stability		P
	Earth-moving machinery with working equipment and/or attachments and optional equipment shall be designed and constructed so that stability is provided under all intended operating conditions including maintenance, assembling, dismantling, and transportation, as specified by the manufacturer in the operator's manual.	Modified by EN 474-5, refers to Part II for details.	P
	Devices intended to increase the stability of earth-moving machinery in working mode (e.g. outriggers, oscillating axle locking) shall be fitted with interlocking devices or check valves which keep them in position in case of hose failure or in case of oil leakage.		P
4.12	Lifting operation		N/A
4.12.1	Lifting device		N/A
	The lifting device shall meet the requirements of Annex C.	No lifting device	N/A
4.12.2	Lowering control device		N/A
	For machines intended for use in lifting operations, a lowering control device shall be installed on each raising boom and arm cylinder. For arm cylinders the device shall be installed at the end which is pressurized to raise the arm away from the base machine. Lowering control devices for boom and arm cylinders shall be tested in accordance with ISO 8643:2017.	The machine is not intended for lifting operation.	N/A
4.12.3	Overload warning device		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	For machines intended for use in lifting operations where: a) the maximum rated lift capacity according to 3.6 is greater than or equal to 1 000 kg, at a minimum lift point radius or; b) an overturning moment greater than or equal to 40 000 Nm an acoustic or visual warning device shall be fitted which indicates to the operator when the rated lift capacity or corresponding overturning moment is exceeded and continues as long as the load or load moment is exceeded. This device may be deactivated while the machine is performing operations other than lifting operation. The activation shall be indicated. The location of the activation/deactivation control shall be within the operator's zone of comfort according to EN ISO 6682:2008.	The machine is not intended for lifting operation.	N/A
4.12.4	Load capacity indicator		N/A
	For machines intended for use in lifting operations where: a) the maximum rated lift capacity according to 3.6 is greater than or equal to 1 000 kg, at a minimum lift point radius, or; b) an overturning moment greater than or equal to 40 000 Nm a load capacity indicator shall be fitted. This device may be deactivated while the machine is performing operations other than lifting operation. The activation shall be indicated. The location of the activation/deactivation control shall be within the operator's zone of comfort according to EN ISO 6682:2008.	The machine is not intended for lifting operation.	N/A
4.12.5	Rated capacity limiting device		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	For machines intended for use in lifting operations where: a) the maximum rated lift capacity according to 3.6 is greater than or equal to 1 000 kg, at a minimum lift point radius or; b) an overturning moment greater than or equal to 40 000 Nm a rated capacity limiting device shall be fitted. The rated capacity limiter shall prevent the machine from exceeding the maximum rated lift capacity while lifting. It shall not prevent the reduction of load or load moment. This device may be deactivated while the machine is performing operations other than lifting operation. The activation shall be indicated. The location of the activation/deactivation control shall be within the operator's zone of comfort according to EN ISO 6682:2008.	The machine is not intended for lifting operation.	N/A
4.12.6	Rated lift capacity information		N/A
	Rated lift capacity information shall be provided for machines configured for lifting operations as intended by the manufacturer. The information shall be legible, durable, and in a prominent position, readable by the operator from the operator’s position. The rated lift capacity information shall also be in the operator’s manual. The rated lift capacity information may be provided by a film/decal, electronically by a monitor, or flip chart affixed in a prominent position.	The machine is not intended for lifting operation.	N/A
4.12.7	Fitness for purpose		N/A
4.12.7.1	General		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	As a general rule, static and dynamic tests shall be carried out on each machine after it has been assembled and before it is first put into service. For machinery produced in series, where the production techniques employed and the application of a duly documented quality control system make it possible to guarantee that every machine produced will have identical characteristics when fully assembled, static or dynamic tests on adequate samples of the machinery can be considered as fulfilling this requirement. Test loads are defined as follows: — Q1 is the rated maximum lift capacity of the machine; — Q2 is the rated lift capacity at maximum reach.	The machine is not intended for lifting operation.	N/A
4.12.7.2	Static tests		N/A
	The purpose of the static test is to demonstrate the overall structural integrity in static conditions of the machine. Machines shall be tested on firm level ground at 125 % of Q1 and Q2 in the respective positions as defined in 4.12.7.1. The machine shall be considered as passing the test if the test load is supported for 10 min without permanent deformation or patent defect.	The machine is not intended for lifting operation.	N/A
4.12.7.3	Dynamic tests		N/A
	The purpose of the dynamic test is to demonstrate the overall structural integrity in dynamic condition of the machine. Machines shall be tested at 110 % of Q1 and Q2 in a range of movements (e.g. lifting, reaching, slewing) at maximum lifting speed. The machine shall be considered as passing the test if the test is completed without permanent deformation or patent defect.	The machine is not intended for lifting operation.	N/A
4.13	Noise		P
4.13.1	Noise reduction		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Machinery shall be so designed and constructed 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. When designing machinery, the available information and technical measures to control noise at source shall be taken into account. Recommended practice for the design of low-noise machinery is given in EN ISO 11688-1:2009. Examples of noise reduction measures include: — selection of low noise components; — use of exhaust silencers for engine; — the use of sound insulating covers and enclosures around noisy components; — the use of a sound insulating enclosed cab; — place the noisy components away from the normal operator’s position. Other technical measures with similar or higher efficacy can be used by a manufacturer.	Practical methods given in EN ISO 11688-1, -2 to reduce the noise at sources are considered when designing the machine.	P
4.13.2	Noise emission measurement		P
4.13.2.1	Sound power level		P
	The A-weighted sound power level for the different types of earth-moving machinery shall be measured according to ISO 6395:2008 unless otherwise stated in the machine specific parts of this document. See 6.3.2 for declaration of values.	Information on noise emission is provided in the user manual.	P
4.13.2.2	Emission sound pressure level at the operator's station(s)		P
	The A-weighted emission sound pressure level at each operator's station for the different types of earth-moving machinery shall be measured according to ISO 6396:2008 and ISO 6396:2008/Cor. 1:2009 unless otherwise stated in the machine specific parts of this document. See 6.3.2 for declaration of values.	Emission sound pressure level at operator’s position is informed on the instruction manual.	P
4.14	Protective measures and devices		P
4.14.1	Hot parts		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Parts which may become hot as result of operational use shall be designed, constructed, positioned or provided with a thermal guard to minimize the risk of contact with hot parts or hot surfaces in close proximity to the primary opening, operating position and maintenance area, in accordance with EN ISO 3457:2008. NOTE See EN ISO 13732-1:2008 for further guidance.	Hot parts, i.e. the engine, etc., are guarded with fixed guard. The engine is located far away from the primary opening and operating position.	P
4.14.2	Moving parts		P
4.14.2.1	General		P
	All moving parts which create a hazard due to the risk of crushing, shearing, cutting and entanglement shall be guarded.	Inspected and OK	P
	Guards shall be selected from the following; — fixed guard in compliance with EN ISO 3457:2008; — movable guard, in compliance with EN ISO 14120:2015 and fitted with an interlocking device in compliance with EN ISO 14119:2013.	Inspected and OK	P
	Fixed guards shall be installed when access is rarely necessary. Fixed guards that are to be removed as a part of maintenance procedures, described in the operator's manual, shall be fixed by systems that can be opened or removed only with tools. These guards fixing systems shall remain attached to the guards or to the machinery when the guards are removed.	Guards are securely held in place and prevent access to dangerous areas and parts. Key is required to open the guard, which will be operated during maintenance.	P
	Where possible, fixed guards shall be incapable of remaining in place without their fixings.		P
	Movable guards shall be fitted with a support system (e.g. springs, gas cylinders) to secure them in opened position up to a wind speed of 8 m/s and they shall, as far as possible, remain attached to the machine when open.	The movable guards can be secured in opened by mechanical latch.	P
	Tempered glass alone does not fulfil the requirements of a guard.	Inspected and OK	P
4.14.2.2	Moving parts involved in the process		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Where access to moving parts directly involved in the earth-moving process is foreseeable during the working process (e.g. wheel of a trencher or other interchangeable equipment), specific parts 2 to 13 give the relevant safety requirements.		P
4.14.2.3	Articulated machines		N/A
	Articulated machines shall be equipped with an articulated frame lock according to ISO 10570:2004.	No articulated construction	N/A
4.14.3	Sharp edges and acute angles		P
	Sharp edges and acute angles shall meet the requirements defined in ISO 12508:1994 in the areas which can be accessed during operation and daily maintenance, except for the area of the attachment. See also 4.3.1.5.	No sharp edges and acute angles were found in the areas, which can be accessed during operation and daily maintenance.	P
4.14.4	Fenders		N/A
	Earth-moving machinery with a design speed according to ISO 6014:1986 greater than 25 km/h shall be equipped with fenders according to EN ISO 3457:2008, Clause 6, which protect the operator's station from debris. Earth moving machinery without cab shall have fenders that comply with EN ISO 3457:2008, Clause 6.	Crawler machines	N/A
4.15	Recovery, towing away for recovery purposes (TARP), tying-down, lifting and transporting		P
4.15.1	Combined use		P
	The attachment points for recovery, towing away for recovery purposes (TARP), tying down, lifting and transporting may be the same if allowed by the configuration of the machine and shall comply with ISO 15818:2017.		P
4.15.2	Recovery		N/A
	Recovery points shall be provided at the front, or rear, or both of the earth-moving machines up to an operating mass of 50 t, according to ISO 10532:1995 and ISO 10532:1995/AMD 1:2004. Crawler machines are excluded from this requirement.	Crawler machines	N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	For crawler machines and machines with an operating mass over 50 tons, information shall be given in the operator's manual to explain the retrieval procedure and recovery points.		N/A
	The requirement for recovery is not applicable to machines with an operating mass ≤ 1500 kg where recovering can be performed by lifting with lifting device(s) in accordance with 4.15.4.		N/A
4.15.3	Tying-down		P
	To transport earth-moving machinery safely, tying-down attachment points to anchor the machine (e.g. on a trailer) shall be provided and comply with ISO 15818:2017.	The tie-down points are provided and clearly identified. Instructions for tie-down are included in the operation manual.	P
4.15.4	Lifting		P
	Lifting points shall be provided and be designed for the operating mass in the heaviest configuration and shall be clearly identified on machines or subassemblies that are to be lifted in one piece. Lifting points shall comply with ISO 15818:2017.	The lifting points are provided and clearly identified. Instructions for lifting are included in the operation manual.	P
4.15.5	Towing devices for towing other machines		N/A
	If installed, towing devices shall comply with ISO 10532:1995 and ISO 10532:1995/AMD 1:2004 unless they have been the subject of type approval. If a pin is part of the towing device, the pin shall be permanently attached to the device. The securing device for the pin shall not be detachable.	No towing device	N/A
4.15.6	Transportation		P
	Stabilizers, outriggers and other moveable devices that may cause a hazard during transportation if moved out of intended position shall be securely locked in their transport position.	Instructions for transportation are included in the operation manual.	P
4.16	Electro-magnetic compatibility (EMC)		P
	Earth-moving machines shall comply with the requirements of electromagnetic compatibility as specified in EN ISO 13766-1:2018 and EN ISO 13766-2:2018.	Self-declaration to EMC Directive was submitted by the client and included in technical files.	P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4.17	Electrical and electronic systems		P
4.17.1	General requirements		P
	Electrical components and cables shall be selected and installed so as to be suitable for the operating conditions (for example voltage, current, protection against electric shock, grouping of cables) and external influences (for example ambient temperature, presence of water or corrosive substances, mechanical stresses, vibration) that can cause deterioration during the intended use of the machine.	Electrical components and conductors are installed in enclosures to avoid damage.	P
	Machine utilizing on-board voltages in the ranges of 50 V–36 KV AC r.m.s. and 75 V–36 KV DC shall be in accordance with ISO 14990-1:2016 and ISO 14990-3:2016.	Diesel engine driven	N/A
4.17.2	Insulation		P
	The insulation of active, electrical components shall provide sufficient contact resistance to safely prevent a current flow when touched. Electrical wires/cables shall be permanently covered by electrical insulation with adequate resistance; it shall not be possible to remove the insulation from the conductor without tools.	Inspected and OK	P
	In addition, the insulation shall be: — self-extinguishing; — flame-retardant; — heat-resistant within the boundary conditions of intended use of the machine; — and resistant to brittle fracture at low temperatures within the boundary conditions of intended use of the machine.	Inspected and OK	P
4.17.3	Electrical wires/cables routing		P
	Cables shall be protected from damage resulting from a contact with sharp edges, excessive bending, abrasion, fatigue, or cuts.	Inspected and OK	P
	The terminations of cables shall be adequately supported to prevent mechanical stresses at the terminations of the conductors.		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Where cables are routed together or exposed to direct environmental influences these cable bundles shall be fitted with additional protection (e.g. braiding, conduit).		P
	Electrical wires/cables not protected by over-current devices shall not be strapped in direct contact with pipes or hoses containing fuel.		P
4.17.4	Degree of protection		P
	Depending on the location/installation of electrical and electronic components, the following degrees of protection are required: — electronic controls, connectors in control circuits, multi-pin connectors and control switches external to the cab, shall have a minimum protection of IP 55 of EN 60529:1991, EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013; — components installed in the operator's cab or protected against the environment, the protection shall be designed and executed to safeguard a correct function under expected and intended conditions.	The electrical components located outside the cab, have a minimum degree of protection IP55.	P
4.17.5	Detachable connections		P
	In order to avoid incorrect connections, detachable electric wires and cables used to connect components in electric circuits shall be marked and identified in accordance with ISO 9247:1990 and ISO 9247:1990/AMD 1:1998. This requirement does not apply to electrical circuits of anti-theft systems.	The wires are labelled with numbering.	P
4.17.6	Over-current protection device		P
	All electrical and electronic components, assemblies and their connections shall be equipped with an over-current protection device (e.g. over-current fuse), or an equivalent device in their respective circuit.	Fuses are provided for over-current protection.	P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The over-current protection device for the electrical equipment shall be as close as practical to the source. The protecting device for the load centre (e.g. fuse box, relay box) shall be near or adjacent to the battery. Protection devices should be sized to protect the wire sizes attached to them. If a harness is split (separated into multiple wires), then the protection device shall also be placed immediately after the point of the split, unless protection device amperage rating prior to the split is sufficiently low to protect the wire sizes after the split.		P
	The following electrical systems do not require an overcurrent protection device: — the electric starter operating circuit of combustion engines; — the electric charging circuit (generator/alternator) of combustion engines; — the operating circuit of the electric pre-heating or flame starting system of combustion engines; — the operating circuit of certain parts of the exhaust after-treatment system of combustion engines.		P
4.17.7	Batteries		P
	The battery location shall have an easy access. Batteries should be easily removable.	Inspected and OK	P
	Batteries shall be firmly attached in a ventilated space. The batteries shall be provided with measures for safe handling.		P
	Batteries and battery locations shall be designed and built or covered to minimize any hazard to the operator caused by battery acid or acid vapours in the event of overturning of the machine.		P
	Live battery parts (not connected to the frame) and/or connectors shall be covered with insulation material.		P
4.17.8	Battery disconnection		P
	It shall be possible to disconnect batteries easily (e.g. quick coupling, disconnector switch). The symbol 9.16 (battery disconnects/battery shut-off) according to ISO 6405-1:20171 shall be used for identification.	A battery disconnect switch is provided with the symbol according to ISO 6405-1.	P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The disconnection system shall be capable of being locked (e.g. padlock) if reconnection could endanger persons.	Compact machines	N/A
4.17.9	Electrical connector for auxiliary starting aids		N/A
	If electrical connectors for auxiliary starting aid or power supply are mounted on the machine, the connectors shall be in accordance with ISO 11862:1993.	No auxiliary starting aids	N/A
4.17.10	Electric socket for lighting		P
	An electric socket intended for the connection of a lighting device for maintenance use shall be provided on the machine and shall be easily accessible. Voltage of electrical socket shall be marked.	DC socket is provided with voltage marked.	P
	The design of the sockets shall prevent incorrect connection.	Inspected and OK	P
	The requirement for electric socket for lighting is not applicable to non-riding machines with an operating mass ≤ 1 500 kg.	Riding-on machines	N/A
4.18	Hydraulic fluid systems		P
4.18.1	General		P
	Hydraulic fluid systems shall be designed and constructed to withstand loading to pressure to which they are subjected and shall be designed in accordance with EN ISO 4413:2010. NOTE ISO/TS 17165-2:2018 can be used as guidance for hydraulic hose assemblies.	The hydraulic system is designed according to the requirements of ISO 4413.	P
	Pipes and hoses shall be located and, if necessary, restrained to minimize deterioration e.g. through contact with hot surfaces, sharp edges and other damage-causing sources. Visual inspection of hoses and fittings shall be possible (pipes and hoses located inside frames are exempted from this requirement).		P
	Hydraulic hose assemblies that contain fluids at pressures exceeding 5 MPa or temperatures above 60 °C, and which are located within 1,0 m from any surface of DLV (deflection limiting volume, as defined in EN ISO 3164:2013), shall be guarded in accordance with EN ISO 3457:2008, Clause 9. See also 4.3.2.2.		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Fixed parts or components of the machine placed between pipes or hoses and the operator which divert a hazardous spray of fluid, are sufficient protection devices.		P
	Means shall be provided to release and/or reduce the residual pressure in the hydraulic circuit.		P
4.18.2	Hydraulic hoses		P
	Hoses intended to withstand a pressure of more than 15 MPa (150 bar) shall not be installed by means of reusable fittings. Fittings which require dedicated tooling (such as a press) and parts authorized by the manufacturer of the earth-moving machine, are not considered as reusable fittings.	Pipes and hoses of hydraulic lines are so located to prevent in contact with hot surfaces and sharp edges.	P
	Hydraulic hoses shall comply with the requirements of EN ISO 18752:2016.		P
	Exception to EN ISO 18752:2016, Clause 9 “Marking”, shall be allowed to permit comparable marking.		P
4.19	Fuel tanks, DEF/urea tanks, hydraulic tanks and pressure vessels		P
4.19.1	General		P
	Fuel and hydraulic tanks shall be provided with a fluid level indicator (indicator can be e.g. sight gauges, electrical devices, dip sticks). Pressure in the tanks exceeding the specified pressure shall be automatically compensated by a suitable device (e.g. vent, safety valve, etc.).	Fuel and hydraulic tanks are provided with a fluid level indicator.	P
4.19.2	Filler openings		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Filler openings of tanks shall: — have easy access for filling; see 4.2.1 for access requirements and 4.22.1 for opening requirements; — have provisions for lockable filler caps. Filler caps located inside lockable compartments (e.g. engine compartment), or caps which can only be opened with a special tool, do not need a lockable provision; — be located outside the cab, except the hydraulic oil tank on compact machines. The requirements for lockable filler caps are not applicable to machines with an operating mass ≤ 1 500 kg.	Compact machines, no cab is fitted, and the filler opening is easy access. The operating weight of R18 is greater than 1500 kg, the filler opening is lockable.	P
4.19.3	Fuel tanks		P
	Fuel tanks shall withstand an internal pressure of 0,03 MPa (0,3 bar) without permanent deformation or leakage.	Technical files are provided and checked.	P
	All fuel tanks shall comply with the requirements of the fuel leakage inversion test as specified in ISO 21507:2010, 5.1.2.	Technical files are provided and checked.	P
	Non-metallic fuel tanks shall be made of flame retardant material. The speed of flame spread shall not exceed 50 mm/min, when tested according to ISO 3795:1989. NOTE Guidance on non-metallic fuel tanks can be found in ISO 21507:2010 and UN ECE R34.	Technical files are provided and checked.	P
4.19.4	Simple pressure vessels		N/A
	Simple pressure vessels shall comply with EN 286-2:1992.	No such vessels	N/A
4.20	Fire protection		P
4.20.1	Fire resistance		P
	The interior, upholstery and insulation of the cab and other parts of the machine where insulation materials are used, shall be made of flame retardant materials. The burning rate shall not exceed 200 mm/min, tested in accordance with ISO 3795:1989.	Insulation materials used in the cab are made of fire-resistant materials. Technical files are provided and checked.	P
4.20.2	Fire extinguisher		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Earth-moving machinery with an operating mass of > 1 500 kg shall have a defined space for installation of fire extinguisher easily accessible to the operator, or a built-in fire extinguishing system.	The operating weight of R18 is greater than 1500 kg, and a defined space for the fire extinguisher is provided.	P
4.21	Quick coupler		N/A
	Quick coupler shall comply with ISO 13031:2016.	No quick coupler	N/A
4.22	Maintenance		P
4.22.1	General		P
	Machines shall be designed and built so that the routine lubrication and maintenance operations can be carried out safely, whenever possible with the engine stopped.	Safe procedures for maintenance are described in the user manual. It is mentioned in the user manual that the engine shall be stopped before maintenance.	P
	Openings intended for maintenance purposes shall comply with EN ISO 2860:2008.	Technical files are provided and checked.	P
	The design of the machine should preferably permit lubrication and filling of tanks from the ground.	The positions of routine lubrication are located away from the danger parts and operations can be carried out safety from the ground.	P
4.22.2	Routine maintenance		P
	Components (batteries, lubrication fittings, filters, etc.) which require routine maintenance shall be easily accessible for checking and changing. Where tools and accessories are recommended by the manufacturer a lockable compartment shall be provided on the machine to store them. The requirement for a lockable storage box is not applicable to machines with an operating mass ≤ 1 500 kg.	The operating weight of R18 is greater than 1500 kg, and a lockable storage box is provided.	P
4.22.3	Support devices		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	On machines where maintenance can only be performed with equipment in a raised position, such equipment shall be mechanically secured with a device according to ISO 10533:1993 and ISO 10533:1993/AMD 1:2005. If support device(s) is (are) required for routine maintenance, it (they) shall be permanently affixed to the machine or be stored on a safe place on the machine. Engine access panels shall be removable or provided with a device to hold it in the open position.	No such support device	N/A
4.22.4	Access to the engine compartment		P
	The engine compartment shall be guarded against unauthorised access by one of the following means: a) a locking device; b) a barrier to entry that requires the use of a tool or key; c) a guard latch control inside a lockable compartment (e.g. cab). The requirement for guarding against unauthorised access to the engine compartment is not applicable to non-riding machines with an operating mass ≤ 1 500 kg and with no accessible moving engine parts.	The operating weight of R18 is greater than 1500 kg, and the engine compartment is guarded with a locking device.	P
4.22.5	Tiltable cab support device		N/A
	If the operator's cab has an integral tilt system for maintenance, servicing or other non-operational purpose, the cab or system shall be equipped with a support device to hold the cab in the fully raised or tilted position. This system shall meet the requirements of ISO 13333:1994. Tiltable cabs shall be equipped with a locking system of the controls inside the cab to prevent accidental operation. The locking system shall become operational when the cab is tilted. An automatic locking device to secure the cab in the open position and prevent unintended lowering, is required if daily maintenance is needed below a tilted cab.	No tiltable cab	N/A
4.23	Underground operation in non-explosive atmosphere		N/A
	The requirements regarding use of earth-moving machinery in underground operations in non-explosive atmosphere are specified in Annex D.	The machine is not intended for underground operation.	N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
4.24	Speed limit for non-riding machines		N/A
	The travel speed of non-riding earth-moving machinery controlled by an attending operator shall be maximum 6 km/h. If the controls are located at the rear of the machine, the reverse speed shall be maximum 2,5 km/h. When operating downhill at the maximum gradeability the travel speed of the machine shall not increase more than 2 m/min with the speed selector in its pre-set position.	Ride-on machine	N/A
5	Verification of the safety requirements and/or protective/risk reduction measures		P
	Safety requirements and/or protective measures of Clause 4 of this document shall be verified according to Table 1. Table 1 sets out verification methods which shall be applied for each safety requirement in this document. Where X(s) is indicated in the table, the corresponding verification method(s) shall be applied. Table 1 shall be read in conjunction with the corresponding clauses. Table 1 includes the following verification methods: a) calculation: to establish that the requirements of this document have been met; b) visual verification: to establish that something is present (e.g. a guard, a marking, a document); c) measurement: to show that the required numerical values have been met (e.g. geometric dimensions, safety distances, resistance of insulation of the electric circuits, results of physical tests); d) functional tests: to show that the adequate signals intended to be forwarded to the main control system of the complete machine are available and comply with the requirements and with the technical documentation; e) special verification: by reference to a standard which is mentioned in the corresponding clause.		P
6	Information for use		P
6.1	General		P
	Information for use shall be provided in accordance with EN ISO 12100:2010, 6.4.		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
6.2	Machine safety labels		P
	A machine safety label shall be provided on the machine drawing the attention to read the operator's manual. NOTE Machine safety labels are described in the operator's manual and affixed to the machines when the machinery or its accessories present residual risks for the operator and/or persons nearby.	The machine safety label is provided in the operation manual.	P
	Machine safety labels shall comply with ISO 9244:2008 and ISO 9244:2008/AMD 1:2016 or when appropriate ISO 3864-1:2011, ISO 3864−2:2016, ISO 3864−3:2012 and ISO 3864−4:2011.	Technical files are provided and checked.	P
	Machine safety labels performance shall comply with ISO 17398:2004.	Technical files are provided and checked.	P
6.3	Operator’s manual		P
6.3.1	General		P
	The manufacturer shall provide an operator's manual in accordance with 6.4.5 of EN ISO 12100:2010, which shall in addition contain information in accordance with 6.3.2, 6.3.3 and 6.3.4.		P
6.3.2	Information concerning airborne noise emission		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The operator's manual shall contain information on sound power level from the machinery and the emission sound pressure level at the operator's station(s) as follows: — A-weighted sound power level emitted by the machine, where the A-weighted emission sound pressure level at the operator's station(s) (see 4.13.2.2) exceeds 80 dB(A); the value shall be declared and shall have the format of a single number declaration as defined in EN ISO 4871:2009. For noise emission declarations, ISO 6395:2008 does not apply. — the A-weighted emission sound pressure level at the operator's station(s) (see 4.13.2.2) where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this fact shall be indicated; the value shall be declared for each operator's station and shall have the format of a single number declaration as defined in EN ISO 4871:2009. For noise emission declarations, ISO 6396:2008 does not apply. — uncertainties of noise emission values shall be declared.	Information regarding noise emission is provided in the operation manual.	P
6.3.3	Information concerning hand-arm and whole-body vibration emission		P
	The operator's manual shall contain information on hand-arm and whole-body vibration transmission as follows: — 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 shall be mentioned; — the highest root mean square value of weighted acceleration to which the whole body is subjected, if it exceeds 0,5 m/s2. Where this value does not exceed 0,5 m/s2, this shall be mentioned. The particular operating conditions of the machine relevant for the determination of this single value shall be indicated; — the values shall 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; — the uncertainty of measurement.	Information regarding vibration emission is provided in the operation manual.	P
6.3.4	Instructions and information for use and maintenance of the machine		P

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The operator's manual shall comply with ISO 6750-1:2019 and shall, in addition, contain the following, if applicable: 1) instruction that if any part of the protective structure (e.g. ROPS, FOPS) is affected by a plastic deformation and/or rupture (e.g. by roll-over, tip-over or object impact), the protective structure must be replaced according to manufacturer's specifications; 2) information and diagrams on the correct adjustment of visibility aids in relation to the operator's seated position and instructions regarding the cleaning and maintenance of visibility aids to ensure that the operator's field of view remains in conformity with 4.8.1; 3) recommended fuel type and where applicable (i.e. diesel), its sulphur rating; 4) recommended hydraulic oil type and its viscosity and where applicable, its biodegradability status; 5) recommended DEF-type; 6) indication that the machine user has to determine whether additional noise exist due to the characteristics of the workplace, noise emissions from other machinery, the duration of exposure, which require the use of dedicated personal protective equipment e.g. hearing protectors; 7) warning that, in some specific operating conditions of the machine, the actual noise emission may be different from the values determined using the noise test code; 8) see B.8, B.9 and C.5 for additional information requirements.	Required information is provided in the user manual.	P
6.3.5	Operator's manual accessibility		P
	Means shall be provided for the operator's manual to be accessible and available for use. A space intended for the safekeeping of the operator's manual shall be provided on the machine.	The manual can be kept in the backrest of seat.	P
6.4	Machine marking		P
	Each machine shall bear the following minimal information, in a legible and indelible condition:	Inspected and OK	P

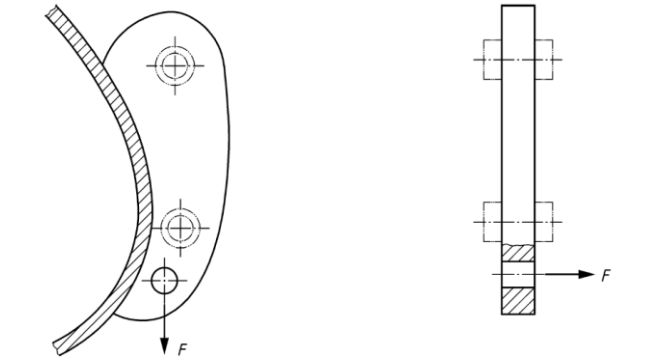
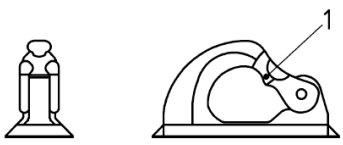
Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	a) the business name and full address of the manufacturer and, where applicable, an authorized representative; b) mandatory marking3); c) designation of series or type; d) designation of machinery; e) serial number e.g. in the format of Product Identification Number (PIN) in accordance with ISO 10261:2021; f) year of construction, that is the year in which the manufacturing process is completed; g) engine power, expressed in kilowatts (kW), according to ISO 14396:2002; h) the operating mass, expressed in kilograms (kg), according to ISO 6016:2008; i) where appropriate maximum drawbar pull provided for at the coupling hook, in Newtons (N); j) where appropriate maximum vertical load provided for on the coupling hook, in Newtons (N); k) if applicable, the number of persons permitted at the movable operator's station; l) if applicable, the maximum working load for the movable operator station.	Inspected and OK	P
Annex A	List of significant hazards	Information	-
Annex B	Requirements for movable operator's station with the operator at the operator's station	No movable operator's station	N/A
B.1	Terms and definitions		-
B.2	General		N/A
	Machines with an elevating, sliding, tilting or otherwise movable operator's station with the operator at the operator's station shall regardless of the relative position (elevation height, horizontal distance and/or tilting angle) of the operator's station to the machine main frame, comply with the requirements of 4.3, 4.4 and 4.5.		N/A
	The vertical lift and descent speed of the elevating operator's station shall not exceed 0,6 m/s under normal operating conditions. The operator's station shall not exceed ± 5° to the horizontal.		N/A

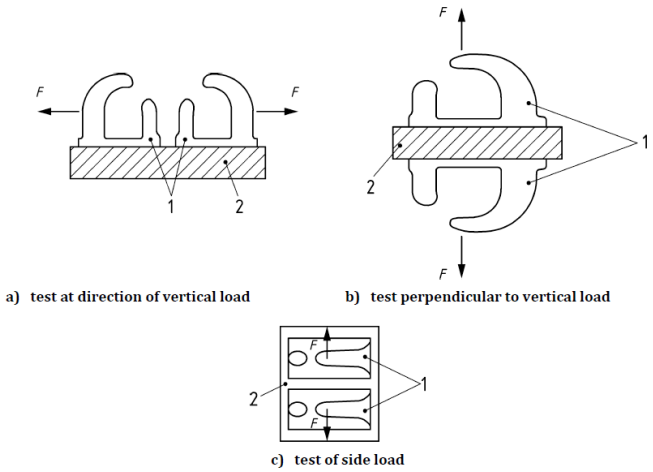
Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Tilting operator's stations shall under normal operating conditions not exceed a speed of 0,6 m/s at the SIP tangential to the overall direction of motion. The tilting angle of an operator's station shall not exceed 5° forward and 45° backward to the horizontal, measured with the machine on level ground.		N/A
	The horizontal retraction speed of the operator’s station towards the machine main frame shall not exceed 0,25 m/s.		N/A
	The sound pressure level at the operator's station shall be measured according to 4.13.2.2 with the operator's station in transport position.		N/A
	If service or maintenance work has to be done with a station in a raised and/or tilted position, a mechanical support device shall be provided that meets the requirements of ISO 13333:1994.		N/A
B.3	Control of movement		N/A
	The controls for horizontal, angular and/or vertical movement of the operator’s station shall be of a hold-to-run type.		N/A
B.4	Emergency descent		N/A
	In case of failure of the source of energy, engine stop or a system failure, it shall be possible for the operator to lower the station to the lowest position (irrespective of the actual position) or to leave the station safely, e.g. by steps or stairs.		N/A
	It shall also be possible for a person outside the operator's station to lower the station from a position outside the hazardous area (see also B.5).		N/A
	The control for the emergency lowering shall be marked red.		N/A
	Vertical descent of the elevating operator’s station shall not exceed 0,4 m/s and the operator's station shall not exceed ± 15° to the horizontal.		N/A
	In case of hydraulic line rupture the tilting operator's stations shall not exceed a speed of 0,4 m/s at the SIP tangential to the overall direction of motion.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
B.5	Crushing hazards		N/A
	If the operator does not have a direct view of the hazardous area between the station and the frame, additional visibility aids (e.g. exterior mirror(s)) shall be installed to allow the operator to observe the hazardous area when lowering or retracting the station.		N/A
B.6	Falling down protection for the operator		N/A
	When the machine is intended for use with the operator's station in an elevated or slid position and the risk of falling down exists the door shall be designed to prevent inadvertent opening (e.g. the use of anti-burst locks and placing of the opening device in an area and direction which requires a deliberate action) or a device that fulfils the requirements of a guard rail as of EN ISO 2867:2011 shall be installed in the doorway.		N/A
B.7	ROPS		N/A
	4.3.3 applies with the following modifications: — the ROPS structure for a movable operator's station shall be tested as a separate independent safety structure, not connected to the machine frame; — only the vertical load test shall be applied in all planes; — in the case of symmetrical design of the structure in one or more direction(s): front/rear, left/right, top/bottom, only one test is required in this/these particular direction(s); — EN ISO 3471:2008, Clause 8 h), does not apply.		N/A
B.8	Operator’s manual		N/A
	The safety instructions for movable stations in the operation manual shall include at least: — safety precautions before and during operations; — the use of operator restraint system; — station position when machine is being repositioned or travelling; — emergency instructions; — the use of mechanical support device for maintenance.		N/A
B.9	Marking		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The carrier supporting the movable operator's station shall be marked by the following: — the number of persons permitted at the operator's station; — the maximum working load.		N/A
B.10	Verification of the safety requirements and/or protective/risk reduction measures		N/A
	Table B.1 sets out verification methods which shall be applied for each safety requirement in Annex B. Where X(s) is indicated in the table, the corresponding verification method(s) shall be applied. Table B.1 shall be read in conjunction with the corresponding clauses. a) calculation: to establish that the requirements of this document have been met; b) visual verification: to establish that something is present (e.g. a guard, a marking, a document); c) measurement: to show that the required numerical values have been met (e.g. geometric dimensions, safety distances, resistance of insulation of the electric circuits, results of physical tests); d) functional tests: to show that the adequate signals intended to be forwarded to the main control system of the complete machine are available and comply with the requirements and with the technical documentation; e) special verification: by reference to a standard which is mentioned in the corresponding clause.		N/A
Annex C	Requirements for lifting devices used for lifting operations	No lifting device	N/A
C.1	General		N/A
	This Annex specifies requirements, with regard to strength, assembly and operation, of lifting device(s) provided by manufacturers of earthmoving machines which are intended to be used in conjunction with lifting accessories for the purpose of carrying out lifting operations. The tests as defined in this annex may be replaced by calculation.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
C.2	Terms, definitions and abbreviations	Information	-
C.3	Safety requirements		N/A
C.3.1	Mounting and fixing		N/A
	The lifting device(s) shall be designed and positioned on the attachment or the other parts of the earth-moving machine such that:		N/A
	a) unintentional unhooking of the load shall be prevented by design, e.g. see Figure C.1;		N/A
	b) hooks shall be provided with a spring-loaded latch meeting the requirements of C.4.1;		N/A
	c) visibility can be maintained between the operator and the slinger [operator to attach the sling to the lifting device(s)] during attaching and detaching of the load;		N/A
	d) it is possible to conduct the intended lifting operations without the sling being deflected from hanging free by contact with other parts of the machine;		N/A
	e) that there is no restriction (e.g. catching) or damage to the lifting device during normal operation of the earthmoving machine or during lifting operation;		N/A
	f) the slinger is not in a hazardous area (e.g. squeezing/shearing or rotating parts) during attaching and detaching of the load;		N/A
	g) hooking and unhooking is easily possible;		N/A
	h) it does not cause a hazard or restrict the performance of the attachment in its normal working process;		N/A
	i) no restriction of the function of the lifting device(s) is caused by external influences (e.g. extreme soil contamination, which cannot be cleaned by simple means).		N/A
C.3.2	Design and strength of lifting device(s)		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The lifting device(s) shall be designed to withstand the load that can be applied at any position of the attachment or parts of the boom. This includes a side load or pull which may occur in practice. The lifting device(s) shall have the following capacity: — 2,5 times the RLL in the direction of the vertical load (see Figure C.1 a) without a visible deformation after completion of the test; — 1,5 times the RLL in side-load (see Figure C.1 b) without visible deformation after completion of the test.		N/A
	 a) direction of the vertical load b) direction of the side load Figure C.1 — Load direction		N/A
C.4	Additional requirements for attachable hooks used as lifting device(s)	No attachable hooks provided	N/A
C.4.1	Spring-loaded latch		N/A
	Attachable hooks shall be provided with a spring-loaded latch (see Figure C.2). The latch shall meet the requirements of EN 1677-2:2000+A1:2008, 5.6. Damage of the latch due to disadvantageous location of the hook shall be avoided. Any loss of function shall not be accepted.		N/A
	 **Key** 1 spring-loaded latch Figure C.2 — Spring-loaded latch		N/A
C.4.2	Design and strength of attachable hooks		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The attachable hook, bolt dimensions, bolt quality (e.g. 8.8), holes at the mounting plate, the distance of the bore holes and the mounting location shall be designed and tested to withstand at the different positions of the attachment or equipment the kind of forces (F) described below: — 4 times of the RLL in direction of the vertical load (see Figure C.3.a), a deformation is acceptable, but the load shall remain supported; — 2,5 times of the RLL perpendicular to the direction of the vertical load see Figure C.3.b), a deformation is acceptable, but the load shall remain supported; — 1,5 times of the RLL side-load (see Figure C.3.c) without visible deformations after completion of the test.		N/A
	 **Key** 1 tow test hooks welded onto the test base 2 test base Figure C.3 — Load direction (example for test base)		N/A
C.4.3	Mounting and fixing of attachable hooks		N/A
	For attachable hooks that can be bolted to the machine, in addition to C.4.2, mounting instructions shall be supplied with each attachable hook that contains the following information: — necessary size of bolts; — necessary quality of bolts; — necessary tightening torque; — minimum thickness, material quality of the plate and location where the attachable hook shall be bolted on the plate.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
C.4.4	Fitness for purpose		N/A
	To verify that lifting devices and attachable hooks can carry out their intended function safely, tests shall be carried out according to C.3.2 and C.4.2, as applicable, either: — on all individual lifting devices and attachable hooks or; — on a sample that is representative of series production, where the manufacturer applies a documented quality control system. The results of the tests shall be noted in test certificate with the date of issue and who has carried out the tests.		N/A
C.4.5	Identification		N/A
	The lifting device(s) shall be permanently marked with a means of identification and the rated lifting load RLL according to C.2.3.		N/A
C.5	Additional information to the operator's manual		N/A
	The operator's manual shall include the following additional information for use of the lifting device(s): — the intended use of the lifting device(s); — the safe hooking of the load; — the visual inspection; — a recommendation for a periodical inspection of the lifting device(s).		N/A
C.6	Verification of the safety requirements and/or protective/risk reduction measures		N/A
	Table C.1 sets out verification methods which shall be applied for each safety requirement in Annex C.		N/A
	Where X(s) is indicated in the table, the corresponding verification method(s) shall be applied.		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Table C.1 shall be read in conjunction with the corresponding clauses. a) calculation: to establish that the requirements of this document have been met; b) visual verification: to establish that something is present (e.g. a guard, a marking, a document); c) measurement: to show that the required numerical values have been met (e.g. geometric dimensions, safety distances, resistance of insulation of the electric circuits, results of physical tests); d) functional tests: to show that the adequate signals intended to be forwarded to the main control system of the complete machine are available and comply with the requirements and with the technical documentation; e) special verification: by reference to a standard which is mentioned in the corresponding clause.		N/A
Annex D	Requirements for earth-moving machinery used in underground working in non-explosive atmosphere	Not used underground	N/A
D.1	General		N/A
	This Annex gives additional requirements and exceptions for earth-moving machinery intended to be used in underground working in non-explosive atmosphere. NOTE 1 An example of underground working is tunnelling. NOTE 2 For additional requirements for earth-moving machinery used underground in potentially explosive atmospheres, see ATEX Directive 2014/34/EU. NOTE 3 Finishing or maintenance work in open tunnels is not regarded as underground work according to this document.		N/A
D.2	Operator's station		N/A
D.2.1	Operator's station with reduced dimension of the cab		N/A
D.2.1.1	Space envelope		N/A
	The space envelope height of machines with cab can be reduced, but shall not be less than 900 mm above SIP.		N/A
D.2.1.2	Transmitted vibration		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	The seat shall comply with EN ISO 7096:2020 If for technical reasons this is not possible, seat compliant to spectral class EM 8 shall be used.		N/A
D.2.1.3	Seat		N/A
	If 4.4.1.3 cannot be met for space reasons, vertical adjustment according to ISO 11112:1995 and ISO 11112:1995/AMD 1:2001, Table 1, h1, is not required.		N/A
D.3	Engine exhaust emission and fuel		N/A
D.3.1	Engine and fuel		N/A
	Only reciprocating internal combustion engines shall be used which meet the requirements of EN 1679-1:1998+A1:2011 operating with a fuel having a flash point exceeding 55 °C.		N/A
D.3.2	Fuel system		N/A
	In case of failure in the fuel line between the fuel tank and the engine, an easily accessible device shall be fitted to block the fuel line as close as possible to the tank to prevent leakage.		N/A
D.4	Lighting, signalling and marking lights and reflex-reflector devices		N/A
D.4.1	General		N/A
	4.8.2 applies with the exceptions specified in D.4.2 to D.4.4.		N/A
D.4.2	Light assembly position		N/A
	The assembly position as specified in ISO 12509:2004 may be adapted to the application in underground working.		N/A
D.4.3	Rear position lamp		N/A
	4.8.2 applies with the following addition: ISO 12509:2004, E.10, applies also for machines, category I A, I B and III B.		N/A
D.4.4	Machines working in both directions in work cycle		N/A

Absatz *Clause*	**Anforderungen - Prüfungen /** *Requirements - Tests*	**Messergebnisse – Bemerkungen/** *Measuring results - Remarks*	**Ergebnis** *Result*
	Where a machine is capable of operation in both directions (forward/reverse) in the work cycle, the lighting shall be arranged with special warning light and duplication of work lamp, and to the front and rear, duplication of rear position lamp (red/white). Illumination of appropriate position lamps shall automatically be linked to the corresponding direction of travel.		N/A
D.5	Fire protection		N/A
	In addition to 4.20 the following applies: Earth-moving machines with an internal combustion engine shall be fitted with a built-in fire extinguishing system.		N/A
D.6	Verification of the safety requirements and/or protective/risk reduction measures		N/A
	Table D.1 sets out verification methods which shall be applied for each safety requirement for Annex D. Where X(s) is indicated in the table, the corresponding verification method(s) shall be applied. Table D.1 shall be read in conjunction with the corresponding clauses. a) calculation: to establish that the requirements of this document have been met; b) visual verification: to establish that something is present (e.g. a guard, a marking, a document); c) measurement: to show that the required numerical values have been met (e.g. geometric dimensions, safety distances, resistance of insulation of the electric circuits, results of physical tests); d) functional tests: to show that the adequate signals intended to be forwarded to the main control system of the complete machine are available and comply with the requirements and with the technical documentation; e) special verification: by reference to a standard which is mentioned in the corresponding clause.		N/A

The End of Test Report Part I of II