

ISO 20474-1:2017-07 (E)

Earth-moving machinery - Safety - Part 1: General requirements

Contents		Page
Foreword		vi
Introduction		vii
1	Scope	1
2	Normative references	1
3	Terms and definitions	4
4	Safety requirements and protective measures	6
4.1	General	6
4.2	Access systems	7
4.2.1	General requirements	7
4.2.2	Access to articulated machines	7
4.3	Operator's station	7
4.3.1	General requirements	7
4.3.2	Operator's station equipped with a cab	8
4.3.3	Operator-protective structures	9
4.3.4	Falling-object protective structures (FOPS)	10
4.3.5	Elevating operator's station	10
4.3.6	Replacement of operator protective structure	10
4.4	Seats	10
4.4.1	Operator's seat	10
4.4.2	Additional seat	10
4.5	Operator's controls and indicators	11
4.5.1	General	11
4.5.2	Starting and stopping system	11
4.5.3	Inadvertent activation	11
4.5.4	Pedals	11
4.5.5	Emergency attachment lowering	11
4.5.6	Uncontrolled motion	12
4.5.7	Remote control	12
4.5.8	Visual displays/control panels, indicators and symbols	12
4.5.9	Ride-on machine controls accessible from ground level	12
4.5.10	Non-riding machine controls	12
4.6	Steering systems	12
4.6.1	General	12
4.6.2	Wheeled machines	12
4.6.3	Crawler machines	13
4.7	Brake systems	13
4.8	Visibility	13
4.8.1	Operator's field of view	13
4.8.2	Lighting, signalling and marking lights, and reflex-reflector devices	13
4.9	Warning devices and safety signs	13
4.10	Tyres and rims	14
4.11	Stability	14
4.12	Object handling	14
4.12.1	Lifting devices for object handling	14
4.12.2	Lowering control device	14
4.13	Noise	14
4.13.1	Requirements for noise reduction	14

4.13.2	Noise emission measurement	14
4.14	Protective measures and devices	15
4.14.1	Contaminated area	15
4.14.2	Hot parts	15
4.14.3	Moving parts	15
4.14.4	Guards	15
4.14.5	Articulated frame lock	15
4.14.6	Sharp edges and acute angles	15
4.14.7	Fenders	15
4.15	Retrieval, transportation, lifting and towing	16
4.15.1	Common use	16
4.15.2	Retrieval	16
4.15.3	Tying-down	16
4.15.4	Lifting	16
4.15.5	Off-road towing	16
4.15.6	Transportation	16
4.16	Electrical and electronic systems	16
4.16.1	General	16
4.16.2	Degree of protection	17
4.16.3	Electrical connections	17
4.16.4	Over-current protective devices	17
4.16.5	Batteries	17
4.16.6	Battery disconnection	17
4.16.7	Electrical connectors for auxiliary starting aids	17
4.16.8	Electric sockets for lighting	17
4.17	Pressurized systems	18
4.17.1	General requirements	18
4.17.2	Hydraulic lines	18
4.17.3	Hydraulic hose assemblies	18
4.17.4	Air pressure vessels	18
4.18	Fuel tanks, diesel emission fluid tanks and hydraulic oil tanks	18
4.18.1	General requirements	18
4.18.2	Filler openings	18
4.18.3	Fuel tanks	19
4.19	Fire protection	19
4.19.1	Fire resistance	19
4.19.2	Fire extinguisher	19
4.20	Attachments	19
4.20.1	General	19
4.20.2	Identification	19
4.20.3	Instructions	19
4.20.4	Quick couplers	19
4.20.5	Lifting devices	19
4.21	Maintenance	20
4.21.1	General	20
4.21.2	Routine maintenance	20
4.21.3	Support devices	20
4.21.4	Access to the engine compartment	20
4.21.5	Tiltable cab support device	20
4.22	Underground operation in non-explosive atmosphere	20
4.23	Rear-mounted winch	21
4.23.1	Mounting	21
4.23.2	Controls	21
4.23.3	Protection	21
4.24	Speed limit for non-riding machines	21
5	Verification of safety requirements	21
6	Information for use	22
6.1	Safety labels	22
6.2	Operator's manual	22

6.3	Machine marking	22
Annex A (informative)	List of significant hazards	23
Annex B (normative)	Requirements for elevating operator's stations	27
Annex C (normative)	Requirements for lifting devices used in object handling	29
Annex D (normative)	Requirements for earth-moving machinery used underground in non-explosive atmospheres	35
Bibliography		37