ISO 10896-1:2020-04 (E)

Rough- terrain trucks - Safety requirements and verification - Part 1: Variable-reach t rucks

Contents

Page

Foreword vi

Introduction vii

1 Scope 1

2 Normative references 2

3 Terms and definitions 3

4 Safety requirements and/or protective/risk reduction measures 8
4.1 General 8
4.1.1 General 8
4.1.2 Sharp edges and acute angles 8
4.1.3 Stored energy components 8
4.2 Starting/moving and stopping 8
4.2.1 Unauthorized starting 8
4.2.2 Stopping system 8
4.2.3 Unintended movement 8
4.2.4 Uncontrolled motion 9
4.2.5 Powered travel movement 9
4.2.6 Non-activation of the parking brake 9
4.2.7 Brakes 9
4.3 Electrical and electronic systems 9
4.3.1 General 9
4.3.2 Degree of protection 10
4.3.3 Electrical connections 10
4.3.4 Batteries 11
4.4 Controls 11
4.4.1 General 11
4.4.2 Multiple operating positions 13
4.4.3 Controls of trucks accessible from ground level 13
4.4.4 Inadvertent activation 13
4.4.5 Travel controls 13
4.4.6 Differential locking 15
4.4.7 Steering controls 15
4.4.8 Load-handling controls 16
4.4.9 Multi-function controls 17
4.4.10 Stabilizing device control 17
4.4.11 Sway/levelling control 17
4.4.12 Axle oscillation locking-mechanism control 17
4.4.13 Hand throttle control 17
4.5 Power systems and accessories 17
4.5.1 Exhaust systems 17
4.5.2 Cooling systems 18
4.5.3 Tanks and pressure vessels 18
4.6 Stabilizing devices 18
4.7 Design requirements for maintenance purposes 19
4.7.1 General 19
4.7.2 Tiltable cab support device 19
4.8 Systems for lifting, tilting and reaching 19

4.8.1 Chains and wire ropes 19
4.8.2 Hydraulic system 20
4.8.3 Maximum load-lowering speed 21
4.8.4 Limitation of stroke 21
4.8.5 Fork arms, attachments and attachment brackets 21
4.9 Operator's station 21
4.9.1 General requirements 21
4.9.2 Storage of operator's manual 21
4.9.3 Hot parts 21
4.9.4 Pipes and hoses 22
4.9.5 Operator's station equipped with enclosed cab 22
4.9.6 Operator's seat 24
4.9.7 Control panels and symbols on displays 25
4.9.8 Other indicating devices 25
4.10 Operator access 25
4.10.1 General requirements 25
4.10.2 Enclosed cab openings 25
4.11 Protective measures and devices 26
4.11.1 Hot parts 26
4.11.2 Protection against crushing, shearing and trapping 26
4.11.3 Guards 26
4.11.4 Engine compartment 26
4.11.5 Fenders 27
4.11.6 Roll-over protective structures (ROPS) and falling object protective structures (FOPS) ... 27
4.11.7 Elevating and/or tiltable operator's station 27
4.11.8 Audible warning devices 27
4.12 Stability 27
4.12.1 Stability tests on tilting platform 27
4.12.2 Longitudinal load moment control 27
4.13 Visibility 27
4.14 External lighting devices 27
4.15 Fire protection 28
4.15.1 Fire resistance 28
4.15.2 Fire extinguisher 28
4.16 Retrieval, transportation, lifting and towing 28
4.16.1 General 28
4.16.2 Retrieval 28
4.16.3 Tie-down 28
4.16.4 Lifting 28
4.16.5 Towing 28
4.17 Noise 28
4.18 Electromagnetic compatibility 29

5 Verification of requirements and safety measures 29
5.1 General 29
5.2 Functional verification 29
5.3 Structural verification 29
5.3.1 Test loads 29
5.3.2 Static test 29
5.3.3 Dynamic testing 30
5.4 Load holding verification 30
5.5 Maximum load lowering speed 30

6 Information for use 31
6.1 Instruction handbook 31
6.1.1 General 31
6.1.2 Operating and maintenance instructions 31
6.1.3 Instructions regarding the truck 32
6.1.4 Instructions regarding the operational use of the truck 32
6.1.5 Instructions regarding internal combustion engine trucks 33
6.1.6 Instructions regarding transportation and storage of trucks 33

6.1.7 Instructions regarding inspection and routine maintenance 33
6.2 Graphical symbols and warnings 34
6.2.1 Safety signs and graphical symbols 34
6.2.2 Graphical symbols lift point 34
6.2.3 Graphical symbols tie-down point 34
6.2.4 Graphical symbols of retrieval point 34
6.2.5 Graphical symbols for pneumatic tyre inflation pressures 35
6.2.6 Graphical symbol for fuel filling points 35
6.2.7 Graphical symbol for hydraulic fluid filling points 35
6.2.8 Graphical symbol for stored energy components 36
6.2.9 Graphical symbol for brake fluid filling points 36
6.2.10 Graphical symbol for battery disconnection 36
6.2.11 Warnings 36
6.3 Marking 37
6.3.1 Manufacturer plate(s) 37
6.4 Load charts 37
6.4.1 Trucks with load-carrying attachments 37
6.4.2 Trucks with non-load-carrying attachments 38

Annex A (informative) List of significant hazards 39

Annex B (normative) Attachments and attachment brackets 43

Annex C (normative) Elevating operator's stations 46

Bibliography 48