

DIN EN 1756-1:2021-10 (E)

Tail lifts - Platform lifts for mounting on wheeled vehicles - Safety requirements - Part 1: Tail lifts for goods

Contents		Page
European foreword		6
Introduction		7
1	Scope	9
2	Normative references	10
3	Terms and definitions	11
4	List of hazards	17
5	Safety requirements and/or protective measures	20
5.1	General requirements	20
5.2	Working area	20
5.3	Manual effort	20
5.4	Operating speeds	21
5.4.1	General	21
5.4.2	Vertical speed	21
5.4.3	Stowing and deploying speeds	21
5.4.4	Tilting speed	21
5.5	Load stability	22
5.5.1	Tilt angle	22
5.5.2	Stop devices	22
5.6	Limitations of travel	22
5.7	Layout of wires and pipes	22
5.8	Unauthorized operation	22
5.9	Power supply	22
5.9.1	Isolation of energy sources	22
5.9.2	Tail lift electrical installation	22
5.10	Tail lift stowage	23
5.10.1	Indication	23
5.10.2	Security	23
5.11	Crushing and shearing	23
5.12	Static load coefficients	23
5.13	Platform	23
5.13.1	Surface	23
5.13.2	Bluntness of edges	24
5.13.3	Tail lift used as a link bridge	24
5.13.4	Visibility of platform	24
5.14	Drive systems	24
5.14.1	Unintentional movements	24
5.14.2	Mechanical suspension systems	25
5.14.3	Hydraulic systems	26
5.15	Safety devices	27
5.15.1	Safety related functions	27
5.15.2	Safety mechanisms	28
5.15.3	Springs inside safety devices	28
5.16	Loading control	28
5.16.1	Prevention of lifting excessive loads	28
5.16.2	Excessive moment	28

5.17	Control devices	28
5.17.1	Hold-to run principle	28
5.17.2	Logic	28
5.17.3	Unintentional operation	28
5.17.4	One control device for several movements	29
5.17.5	Several control devices for one movement	29
5.17.6	Mobile control units	29
5.17.7	Cableless mobile control systems	29
5.18	Control positions	30
5.18.1	Multiple control positions	30
5.18.2	Location of control positions	30
6	Verification of the safety requirements and/or measures	30
7	Information for use	35
7.1	General	35
7.2	Tail lift used as a link bridge	35
7.3	Inherent risks associated with improper use	35
7.4	Location and nature of information for use	35
7.4.1	Marking on the tail lift	35
7.4.2	Instructions and handbooks	36
7.4.3	Inspection record	39
Annex A (informative) Tail lift mechanisms and types		40
A.1	Mechanisms	40
A.1.1	Parallelogram	40
A.1.2	Column	40
A.1.3	Telescopic	41
A.2	Types	41
A.2.1	Conventional: (full and part width)	41
A.2.2	Folding platform	42
A.2.3	Retractable	43
A.2.4	Rotary	43
A.2.5	Door mounted	44
A.2.6	Inset	45
A.2.7	Internally mounted	45
A.3	Types of platform	45
Annex B (normative) Crushing and shearing		46
B.1	General	46
B.2	Platform lifting and lowering	46
B.2.1	General	46
B.2.2	Two-hand control units	46
B.2.3	Two-foot control units	47
B.2.4	Toe guard	47
B.2.5	Hinged foot protector	50
B.2.6	Safety sensor	51
B.2.7	Automatic toe protector	52
B.2.8	Assigned operator position	53
B.3	Platforms capable of lifting above vehicle floor level	54
B.4	Platform closure and opening	54
B.4.1	General	54
B.4.2	Two-hand control units	54
B.4.3	Safety sensor	54
B.4.4	Mobile control units	55
Annex C (informative) Structure and drive system		56
Annex D (normative) Drive systems - Steel wire ropes and chains		58

D.1	Recommended specifications of steel wire ropes	58
D.2	Dimensions of pulley grooves	58
D.3	Flare angle	58
D.4	Fleet angles	59
D.5	Pitch circle	59
Annex E (normative) Examples of controls logic		60
Annex F (informative) Marking		62
Annex G (informative) Detailed examples of unintentional operation		63
Annex H (normative) Verification concerning installation		64
H.1	Compatibility between the lift and the vehicle	64
H.2	Optional equipment	64
H.3	Static test	64
H.3.1	Deformation	64
H.3.2	Drift	64
H.4	Dynamic test	64
H.5	Test of operation and safety function	64
H.6	Test to verify that the tail lift cannot lift excessive load	65
Annex I (informative) Overloads onto a platform at vehicle floor level		66
Annex J (informative) Protective devices for the working area		67
J.1	General	67
J.2	Handholds	67
J.3	Guard-rails	67
J.4	Examples of platform mounted guard-rails	68
J.4.1	General	68
J.4.2	Demountable side guard-rails mounted on the platform surface	68
J.4.3	Foldable side guard-rail mounted on the platform surface	68
J.4.4	Side guard-rail swinging open to the pavement	69
J.4.5	Runner mounted guard-rails - Three-side protection - not permitting side (un)loading	70
J.5	Examples of body mounted guard-rails	70
Annex K (informative) Tail lift electrics		72
K.1	General	72
K.2	Vehicle - Tail lift interface	72
K.2.1	ETMA Code A and B	72
K.2.2	Interface positions	72
K.3	Power supply	73
Annex ZA (informative) Relationship between this European Standard and the Essential requirements of EU Directive 2006/42/EC aimed to be covered		75
Bibliography		79