

DIN EN 13796-1:2017-06 (E)

Safety requirements for cableway installations designed to carry persons - Carriers - Part 1: Grips, carrier trucks, on-board brakes, cabins, chairs, carriages, maintenance carriers, tow-hangers

Contents		Page
European foreword		5
1	Scope	8
2	Normative references	8
3	Terms and definitions	9
4	Symbols and abbreviations	11
5	General requirements	11
5.1	Application of the standard	11
5.2	Safety principles	12
5.2.1	General	12
5.2.2	Hazard scenarios	12
5.2.3	Safety measures	12
6	Basic requirements	13
6.1	Technical documents to be supplied	13
6.1.1	List of safety components	13
6.1.2	Drawings and parts lists	13
6.1.3	Certificates	14
6.1.4	Calculations	14
6.1.5	Self-weight weighing report	14
6.1.6	Operating manual	14
6.2	Actions and effects of the environment	14
6.2.1	Self-weight (G)	14
6.2.2	Useful load (Q)	14
6.2.3	Wind action (F _w)	15
6.2.4	Gripping force (FF)	16
6.2.5	Opening and closing force (O)	16
6.2.6	Reaction force when entering the station (R)	17
6.2.7	Reaction force when passing round a sheave (U)	17
6.2.8	Force due to haulage rope support (F _s)	17
6.2.9	Damping moment (MY)	17
6.2.10	Torsional moment (MZ)	17
6.2.11	Force due to impact on guides (HY2)	17
6.2.12	Force due to impacts resulting from the action of the carrier truck brake (HX2)	17
6.2.13	Force due to the action of the on-board brake (QF)	17
6.2.14	Longitudinal force due to the passengers (HX1)	18
6.2.15	Transverse force due to the passengers (HY1)	18
6.2.16	Snow and frost actions	18
6.2.17	Force due to impact against buffers (AX)	19
6.2.18	Action caused by the gradient of the ropes (FN)	19
6.2.19	Force transverse to the track (FY)	19
6.3	Verifications	19
6.3.1	General	19
6.3.2	Static verifications	20
6.3.3	Fatigue verification	29

6.4	Materials	36
6.4.1	General	36
6.4.2	Steels	36
6.4.3	Welded components	36
6.5	Construction principles	36
6.6	Production tests	37
6.7	Fire prevention and firefighting	37
7	End fixings for ropes and grips	38
7.1	General	38
7.2	Haulage rope drum end fixing	38
7.2.1	General	38
7.2.2	Haulage rope end clamps on fixing drum	38
7.2.3	Drum grooves	38
7.2.4	Coefficients of friction	38
7.3	Drum fixing of a continuous haulage rope	39
7.4	Socket end fixings (dry/cast sockets)	39
7.4.1	General	39
7.4.2	Conical bush for cast socket	40
7.5	Aerial ropeway grips (excluding chapeaux de gendarme)	41
7.5.1	General	41
7.5.2	Fixed grips	44
7.5.3	Detachable grips	45
7.6	Chapeau de gendarme	46
7.6.1	General	46
7.6.2	Design requirements	46
7.6.3	Verifications	46
7.6.4	Coefficients of friction	47
7.7	Grips for towing ropes	47
7.7.1	General	47
7.7.2	Fixed grips	48
7.7.3	Detachable bush grips	49
8	Carrier trucks for aerial ropeways	49
9	Chassis of funicular railways	50
10	On-board brakes	51
10.1	Automatic application	51
10.2	Manual application	51
10.3	Verifications of the brake	51
11	Cabins, chairs and other carriers of aerial ropeways	52
11.1	General	52
11.1.1	Space envelopes	52
11.1.2	Carrier equipment	52
11.2	Cabins	53
11.2.1	General	53
11.2.2	Cabins for reversible aerial ropeways	57
11.2.3	Cabin doors	58
11.3	Rescue carriers	58
11.4	Chairs	58
11.4.1	General	58
11.4.2	Seats, backs and armrests	59
11.4.3	Safety bars and footrests	59
11.4.4	Hoods	60
12	Carriages for funicular railways	62
12.1	General	62
12.2	Carriage doors	65
12.2.1	General	65

12.2.2	Doors for carriages with attendant	65
12.2.3	Doors for carriages without attendant	65
13	Maintenance vehicles	66
13.1	General	66
13.2	Space envelopes	66
13.3	Identification plate	67
13.4	Dimensioning of the carrier	67
14	Tow-hangers	67
14.1	General	67
14.2	Rods and springboxes	67
14.3	T-bars and platters	68
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2000/9/EC relating to cableway installations designed to carry persons		70
Bibliography		74