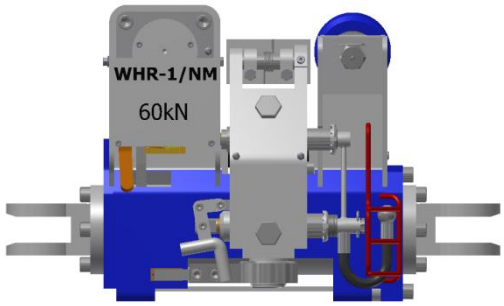
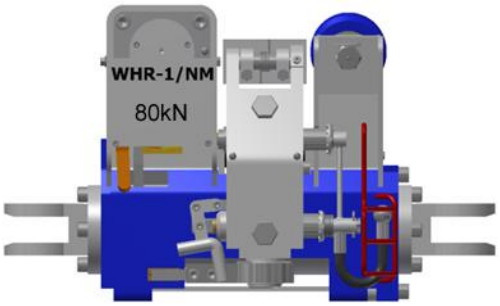
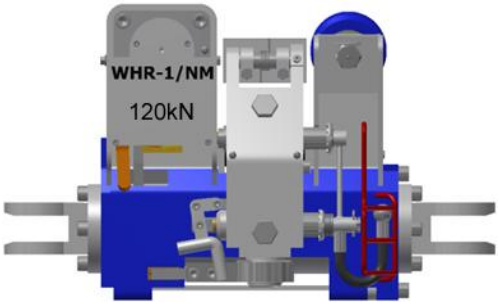
Zakład Budowy Maszyn Doświadczalnych Sp. z o.o.
41-708, Ruda Śląska, ul. Pawła 6

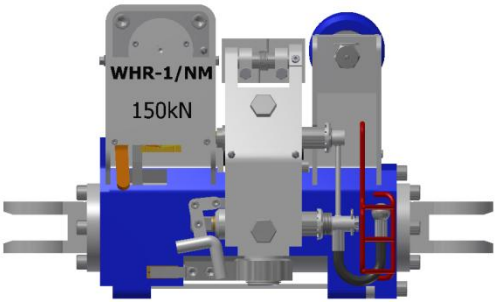
SPECIFICATION SHEET

brake trolley type WHR-1/NM
with additional dedicated accessories









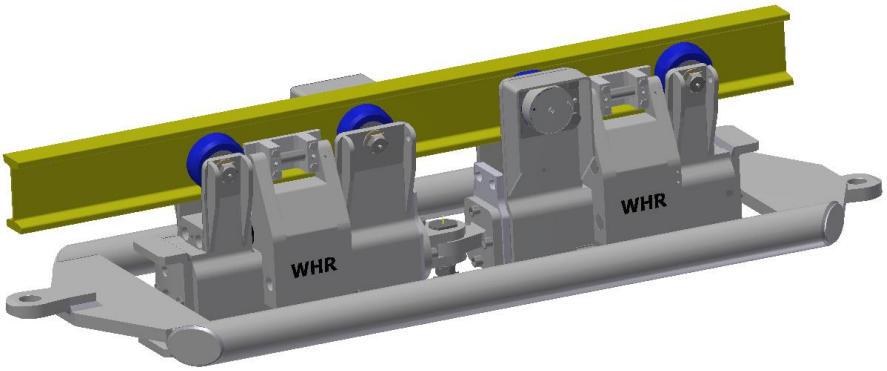


Table of contents

1. Brake trolleys WHR-1/NM version 12kN, 60kN, 80kN, 120kN and 150kN 3

1.1. General description of the product 3

1.2. Basic technical data 4

1.3. Basic technical data WHR-1/NM 12kN 6

1.4. Table and chart of the permissible maximum and minimum weight of the transport set for one WHR-1/NM12kN trolley 7

1.5. Basic technical dataWHR-1/NM 60kN 8

1.6. Table and chart of the permissible maximum and minimum weight of the transport set for one WHR-1/NM60kN trolley 9

1.7. Basic technical data WHR-1/NM 80kN 11

1.8. Table and chart of the permissible maximum and minimum weight of the transport set for one WHR-1/NM80kN trolley 12

1.9. Basic technical data WHR-1/NM 120kN 14

1.10. Table and chart of the maximum and minimum permissible weight of the transport set for one WHR-1/NM 120kN trolley 15

1.11. Basic technical data WHR-1/NM 150kN 17

1.12. Table and chart of the maximum and minimum permissible weight of the transport set for one WHR-1/NM 150kN trolley 18

2. Guide frame drawbars versions: CRP-1 and CRP-2 20

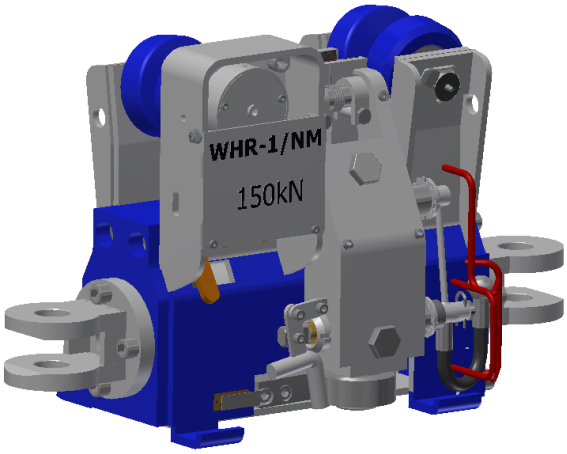
2.1. General description of the product 20

2.2. Technical data of CRP drawbar 21

3. Contact details 21

1. Brake trolleys WHR-1/NM version 12kN, 60kN, 80kN, 120kN and 150kN

1.1.General description of the product



Brake trolley WHR-1/NM

The brake trolley type WHR-1/N/ is designed for securing transport sets of suspended railway trains with own or cable drive e.g. tractor, diesel locomotive for material or human transport. The trolley plays the role of an emergency brake whose task is to stop a transport set of a railway.

It may be used in underground mines in methane areas, in excavations classified as class "a", "b" or "c" methane explosion hazard and class A or B coal dust explosion hazard.

ADVANTAGES OF THE NEW WHR-1/NM

According to the technical data table attached below, you can compare the parameters of other brake trolleys produced by other manufacturers. **Thanks to the application of new technologies the trolley has a reduced weight of approximately 129 kg and the overall dimensions have been reduced to a minimum: length 463 mm without hooks and width 312 mm.**
The brake trolley is manufactured in five versions: 12kN, 60kN, 80kN, 120kN and for special transport of extremely heavy loads 150kN.
An illustration of a possible configuration is shown below.
The use of each of the new generation WHR-1/NM brake trolleys, due to their lower weight and smaller dimensions, makes it possible to load more materials for transport and shortens the transport set, resulting in an overall reduction in operating costs.

1.2.Basic technical data

Trolley type / configuration	WHR - 1/NM	DUO	TRIO	QUADRO	OTTO
Static brake force of a trolley in WHR version - 1/NM/12	min 12 kN	--------	--------	--------	--------
Transport unit travel speed	max. 1.4m/s	--------	--------	--------	--------
Brake release speed	0.8 - 1.6 m/s	--------	--------	--------	--------
Slope of the track - material transport	max 25°	--------	--------	--------	--------
Static brake force of a trlooey in WHR version - 1/NM/60	min 60 kN	min 2x60 kN	min 3x60 kN	min 4x60 kN	min 8x60kN***
Static brake force of the trolley in WHR version - 1/NM/80	min. 80 kN	min 2x80 kN	min 3x80 kN	min 4x80 kN	min 8x80 kN***
Transport unit travel speed	max. 2.5m/s	max. 2.5m/s	max. 2.0m/s	max. 1.8 m/s	max.1,6m/s
Brake release speed	0.8 - 3.2m/s	0.8 - 3.2 m/s	0.8 - 2.8m/s	0.8 - 2.6m/s	0.8 - 2.2m/s
Static brake force of a trolley in WHR version - 1/NM/120	***min 120kN	***min 2x120kN	***min 3x120kN	***min 4x120 kN	----------
Static brake force of a trolley in WHR version - 1/NM/150	***min. 150 kN	***min. 2x150 kN	***min. 3x150kN	***min. 4x150kN	---------
Transport unit travel speed	max. 2.5m/s	max. 2.0m/s	max. 1.8m/s	max. 1.6 m/s	---------
Brake release speed	0.8 -3.2m/s	0.8 - 2.8m/s	0.8 - 2.6 m/s	0.8 - 2.2 m/s	---------
Release time of the brake system of the trolley/combination of trolleys	max 0,3 s	max 0,7 s	max 0,7 s	max 0,7 s	max 0,7 s
Brake application speed	*min. 0.8 m/s - max 6.0 m/s				
Maximum pulling-pushing force 150 kN	**also 150kN in the CRP drawbar frame or in the CP-180kN frame**				
Coupling pin diameter	min. 30 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm
Unladen weight Without hooks	129 kg	2x 129 kg	3x 129 kg	4x 129 kg	8x 129 kg
Length of hydraulic lines	-	max. 60m	max. 60m	max. 60m	max. 50m
Slope of the track - material transport	max. 30°	max. 30°	max. 30°	max. 30°	max. 30°
Gradient of the track - carriage of people	**max.30°	** max.30°	0°	0°	0°

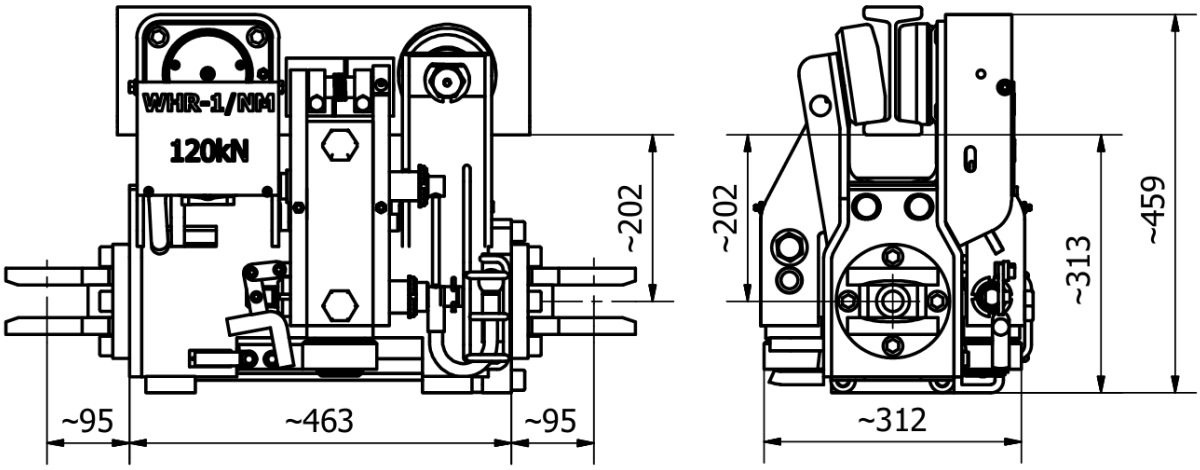
*)The value depends on the use of the trolley and the regulations in force, defined by the user at the time of ordering.

**)Maximum gradient of the transport30° track according to the applicable regulations in the user's country.

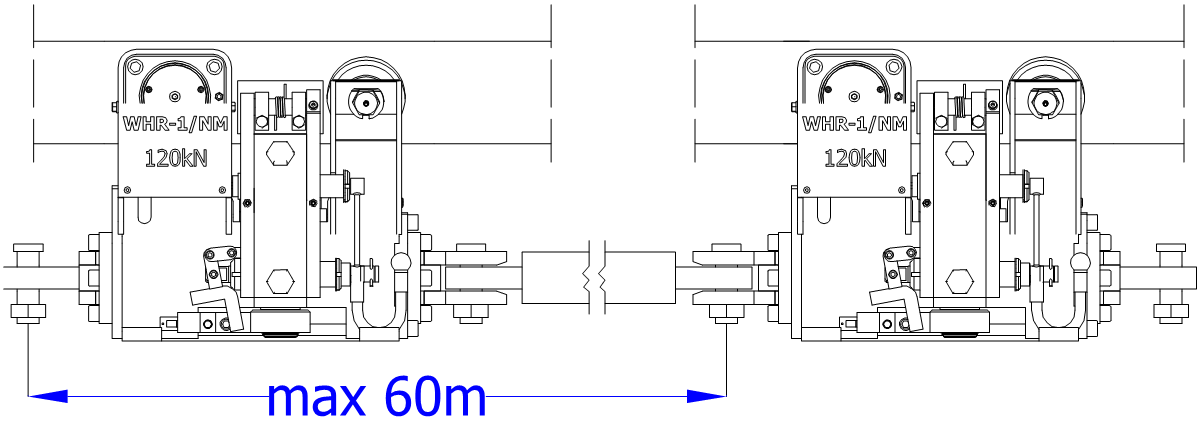
***To enable special transport of extremely heavy loads it is possible to combine two or more brake trolleys in accordance with the permitted load capacity of the suspension track.

WHR-1/NM 60kN and 80kN trolleys are compatible replacements for WHR-1/N 52kN and 78kN trolleys

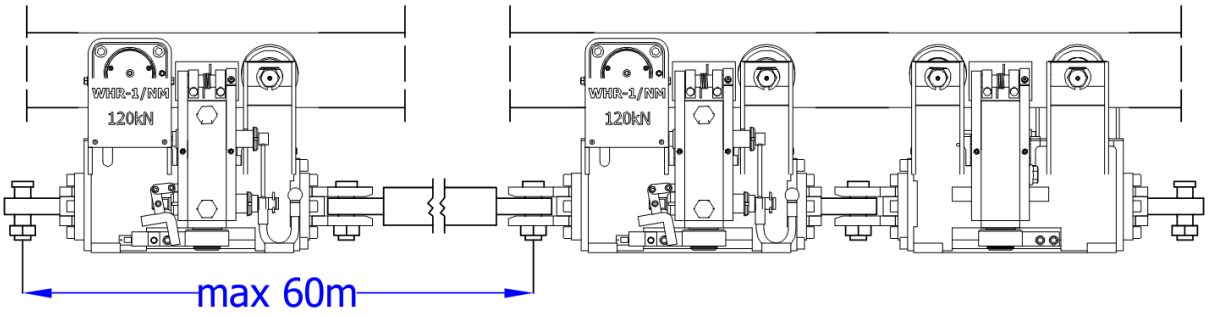
Dimensions of WHR-1/NM trolley



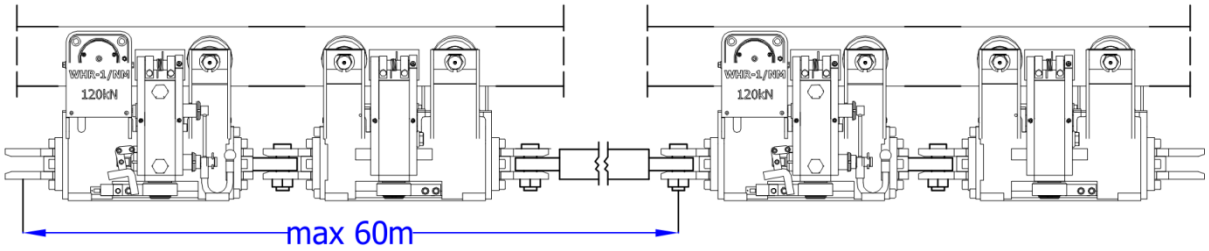
WHR-1/NM trolley set in DUO **arrangement**



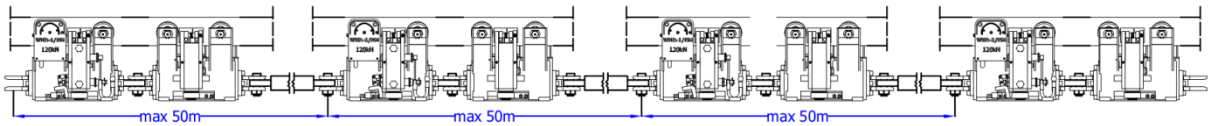
WHR-1/NM trolley set in TRIO arrangement



WHR-1/NM trolley set in QUADRO **arrangement**



WHR-1/NM trolley set in OTTO arrangement

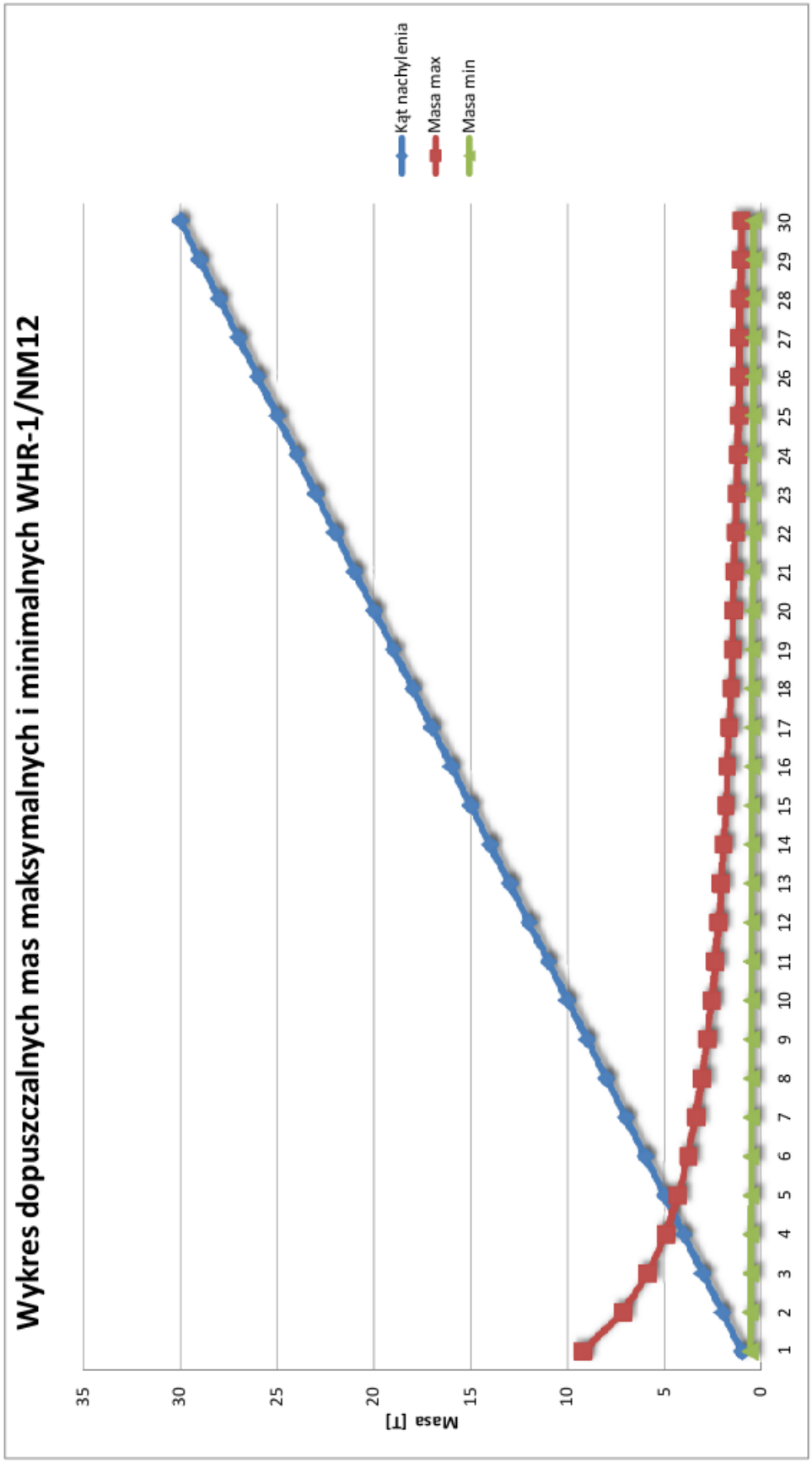


1.3.Basic technical data WHR-1/NM 12kN

Trolley type / configuration	WHR - 1/NM
Static brake force of a trolley in WHR version - 1/NM/12	min 12 kN
Transport unit travel speed	max. 1.4m/s
Brake release speed	0.8 - 1.6 m/s
Slope of the track - material transport	max 25°
Release time of the bogie braking system	max 0,3 s
Coupling pin diameter	min. 30 mm max. 45 mm
Unladen weight Without hooks	129 kg
Min. pressure WHR-1/NM 12kN	$6^{+0,5}$ MPa
Max. pressure WHR-1/NM 12kN	$9^{+1,0}$MPa

Slope routes $\alpha\nu\delta$ [degrees].	Weight of the set (including the weight of the trolley) WHR-1/NM2kN1 [kg].	
	Max	Min
1	9 209	593
2	7 161	583
3	5 857	573
4	4 955	564
5	4 293	555
6	3 788	546
7	3 389	537
8	3 066	529
9	2 800	521
10	2 577	514
11	2 386	506
12	2 223	499
13	2 081	492
14	1 956	485
15	1 845	479
16	1 747	472
17	1 659	466
18	1 580	460
19	1 508	455
20	1 443	449
21	1 383	444
22	1 329	438
23	1 279	433
24	1 233	428
25	1 190	423
26	1 150	419
27	1 114	414
28	1 080	410
29	1 048	406
30	1 018	401

1.4.Table and chart of the permissible maximum and minimum weight of the transport set for one WHR-1/NM12kN trolley



1.5.Basic technical dataWHR-1/NM 60kN

Trolley type / configuration	WHR - 1/NM	DUO	TRIO	QUADRO	OTTO
Static brake force of a trolley in WHR version - 1/NM/60	min 60 kN	min kN120	min 180 kN	min 240 kN	min 480kN***
Transport unit travel speed	max. 2.5m/s	max. 2.5m/s	max. 2.0m/s	max. 1.8 m/s	max.1,6m/s
Brake release speed	0.8 - 3.2m/s	0.8 - 3.2 m/s	0.8 - 2.8m/s	0.8 - 2.6m/s	0.8 - 2.2m/s
Release time of the brake system of the trolley/combination of trolleys	max 0,3 s	max 0,7 s	max 0,7 s	max 0,7 s	max 0,7 s
Possible brake application speed	*min. 0.8 m/s - max 6.0 m/s				
Maximum pulling-pushing force 150 kN	**also 150kN in the CRP drawbar frame or in the CP-180kN frame**				
Coupling pin diameter	min. 30 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm
Unladen weight Without hooks	129 kg	2x 129 kg	3x 129 kg	4x 129 kg	8x 129 kg
Length of hydraulic lines	-	max. 60m	max. 60m	max. 60m	max. 50m
Slope of the track - material transport	max. 30°	max. 30°	max. 30°	max. 30°	max. 30°
Gradient of the track - carriage of people	**max.30°	** max.30°	0°	0°	0°
Max. pressure WHR-1/NM 60kN	9 $^{+1,0}$MPa	9 $^{+1,0}$MPa	9 $^{+1,0}$MPa	9 $^{+1,0}$MPa	9 $^{+1,0}$MPa
Min. pressure WHR1/NM 80kN	6 $^{+0,5}$ MPa	6 $^{+0,5}$ MPa	6 $^{+0,5}$ MPa	6 $^{+0,5}$ MPa	6 $^{+0,5}$ MPa

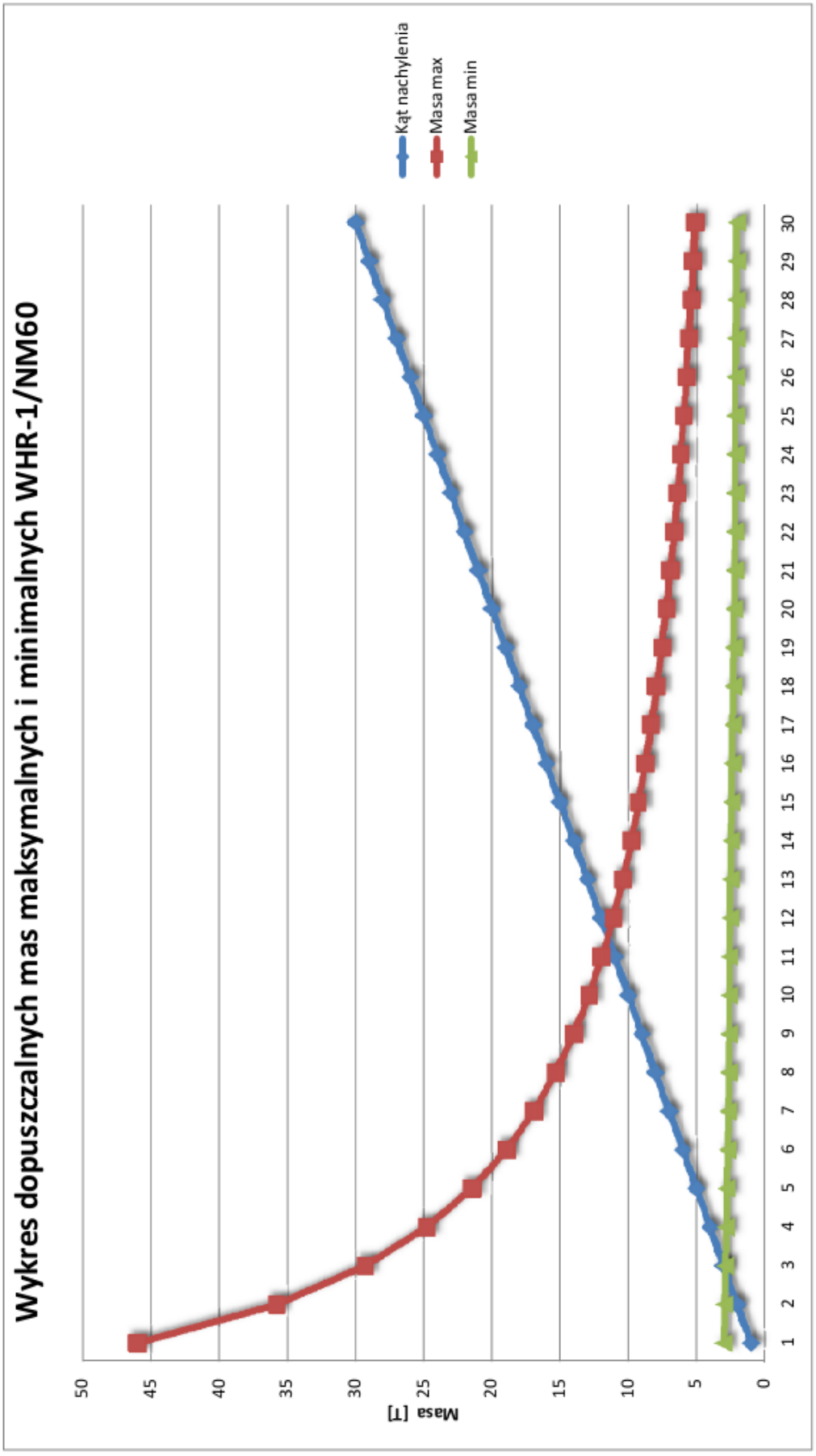
***)The value depends on the use of the trolley and the regulations in force, defined by the user at the time of ordering.**
****)Maximum gradient of the transport30° track according to the applicable regulations in the user's country.**

*****To enable special transport of extremely heavy loads it is possible to combine two or more brake trolleys in accordance with the permissible load capacity of the suspension track.**

WHR-1/NM 60kN and 80kN trolleys are compatible replacements for WHR-1/N 52kN and 78kN trolleys

1.6.Table and chart of the permissible maximum and minimum weight of the transport set for one WHR-1/NM60kN trolley

Slope routes $\alpha\nu\delta$ [degrees].	Weight of the set (including the weight of the trolley) WHR-1/NM60kN [kg].	
	Max	Min
1	46 047	2 964
2	35 804	2 914
3	29 285	2 866
4	24 773	2 819
5	21 465	2 773
6	18 938	2 730
7	16 943	2 687
8	15 331	2 646
9	13 999	2 607
10	12 883	2 568
11	11 932	2 531
12	11 114	2 495
13	10 403	2 460
14	9 779	2 426
15	9 227	2 394
16	8 736	2 362
17	8 296	2 331
18	7 899	2 302
19	7 541	2 273
20	7 215	2 245
21	6 917	2 218
22	6 645	2 191
23	6 394	2 166
24	6 164	2 141
25	5 950	2 117
26	5 752	2 094
27	5 569	2 071
28	5 398	2 049
29	5 238	2 028
30	5 089	2 007


Wykres dopuszczalnych mas maksymalnych i minimalnych WHR-1/NM60
Kąt nachylenia
Masa max
Masa min
Masa [T]
50
45
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

1.7.Basic technical data WHR-1/NM 80kN

Trolley type / configuration	WHR - 1/NM	DUO	TRIO	QUADRO	OTTO
Static brake force of a trolley in WHR version - 1/NM/80	min 80 kN	min 160 kN	min 240 kN	min 320 kN	min 640kN***
Transport unit travel speed	max. 2.5m/s	max. 2.5m/s	max. 2.0m/s	max. 1.8 m/s	max.1,6m/s
Brake release speed	0.8 - 3.2m/s	0.8 - 3.2 m/s	0.8 - 2.8m/s	0.8 - 2.6m/s	0.8 - 2.2m/s
Release time of the brake system of the trolley/combination of trolleys	max 0,3 s	max 0,7 s	max 0,7 s	max 0,7 s	max 0,7 s
Possible brake application speed	*min. 0.8 m/s - max 6.0 m/s				
Maximum pulling-pushing force 150 kN	**also 150kN in the CRP drawbar frame or in the CP-180kN frame**				
Coupling pin diameter	min. 30 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm
Unladen weight Without hooks	129 kg	2x 129 kg	3x 129 kg	4x 129 kg	8x 129 kg
Length of hydraulic lines	-	max. 60m	max. 60m	max. 60m	max. 50m
Slope of the track - material transport	max. 30°	max. 30°	max. 30°	max. 30°	max. 30°
Gradient of the track - carriage of people	**max.30°	** max.30°	0°	0°	0°
Max. pressure WHR-1/NM 80kN	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa
Min. pressure WHR-1/NM 80kN	11$^{+0,5}$ MPa	11 $^{+0,5}$ MPa	11 $^{+0,5}$ MPa	11 $^{+0,5}$ MPa	11 $^{+0,5}$ MPa

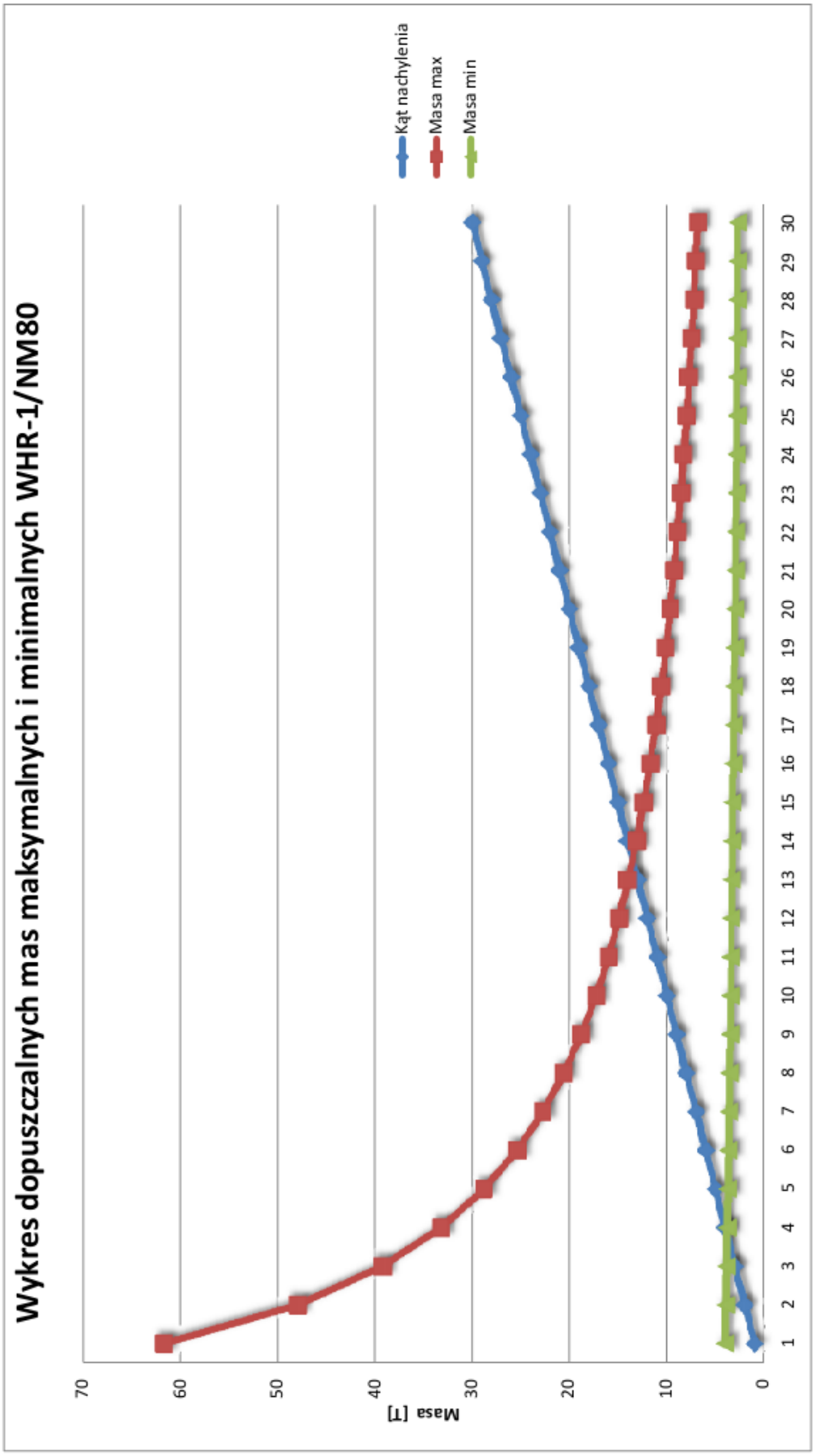
***)The value depends on the use of the trolley and the regulations in force, defined by the user at the time of ordering.**
****)Maximum gradient of the transport30° track according to the applicable regulations in the user's country.**

*****To enable special transport of extremely heavy loads it is possible to combine two or more brake trolleys in accordance with the permissible load capacity of the suspension track.**

WHR-1/NM 60kN and 80kN trolleys are compatible replacements for WHR-1/N 52kN and 78kN trolleys

1.8.Table and chart of the permissible maximum and minimum weight of the transport set for one WHR-1/NM80kN trolley

Slope routes $\alpha\nu\delta$ [degrees].	Weight of the set (including the weight of the trolley) WHR-1/NMkN80 [kg].	
	Max	Min
1	61 722	3 973
2	47 992	3 906
3	39 254	3 841
4	33 206	3 778
5	28 773	3 718
6	25 384	3 659
7	22 711	3 602
8	20 549	3 547
9	18 765	3 494
10	17 268	3 442
11	15 994	3 393
12	14 898	3 344
13	13 944	3 298
14	13 108	3 252
15	12 368	3 209
16	11 709	3 166
17	11 120	3 125
18	10 588	3 085
19	10 108	3 046
20	9 671	3 009
21	9 272	2 972
22	8 907	2 937
23	8 571	2 903
24	8 262	2 870
25	7 976	2 838
26	7 711	2 807
27	7 465	2 776
28	7 235	2 747
29	7 021	2 718
30	6 821	2 691


Wykres dopuszczalnych mas maksymalnych i minimalnych WHR-1/NM80
Kąt nachylenia
Masa max
Masa min
Masa [T]
0
10
20
30
40
50
60
70
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

1.9. Basic technical data WHR-1/NM 120kN

Static brake force of a trolley in WHR version - 1/NM/120	***min 120kN	***min 240kN	***min 360kN	***min 480 kN	----------
Transport unit travel speed	max. 2.5m/s	max. 2.0m/s	max. 1.8m/s	max. 1.6 m/s	---------
Brake release speed	0.8 -3.2m/s	0.8 - 2.8m/s	0.8 - 2.6 m/s	0.8 - 2.2 m/s	---------
Release time of the brake system of the trolley/combination of trolleys	max 0,3 s	max 0,7 s	max 0,7 s	max 0,7 s	---------
Brake application speed	*min. 0.8 m/s - max 6.0 m/s				
Maximum pulling-pushing force 150 kN	**also 150kN in the CRP drawbar frame or in the CP-180kN frame**				
Coupling pin diameter	min. 30 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm
Unladen weight Without hooks	129 kg	2x 129 kg	3x 129 kg	4x 129 kg	8x 129 kg
Length of hydraulic lines	-	max. 60m	max. 60m	max. 60m	max. 50m
Slope of the track - material transport	max. 30°	max. 30°	max. 30°	max. 30°	max. 30°
Gradient of the track - carriage of people	**max.30°	** max.30°	0°	0°	0°
Max. pressure WHR-1/NM 120kN	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa	14 $^{+1,0}$MPa
Min. pressure WHR-1/NM 120kN	11$^{+0,5}$ MPa	11 $^{+0,5}$ MPa	11 $^{+0,5}$ MPa	11 $^{+0,5}$ MPa	11 $^{+0,5}$ MPa

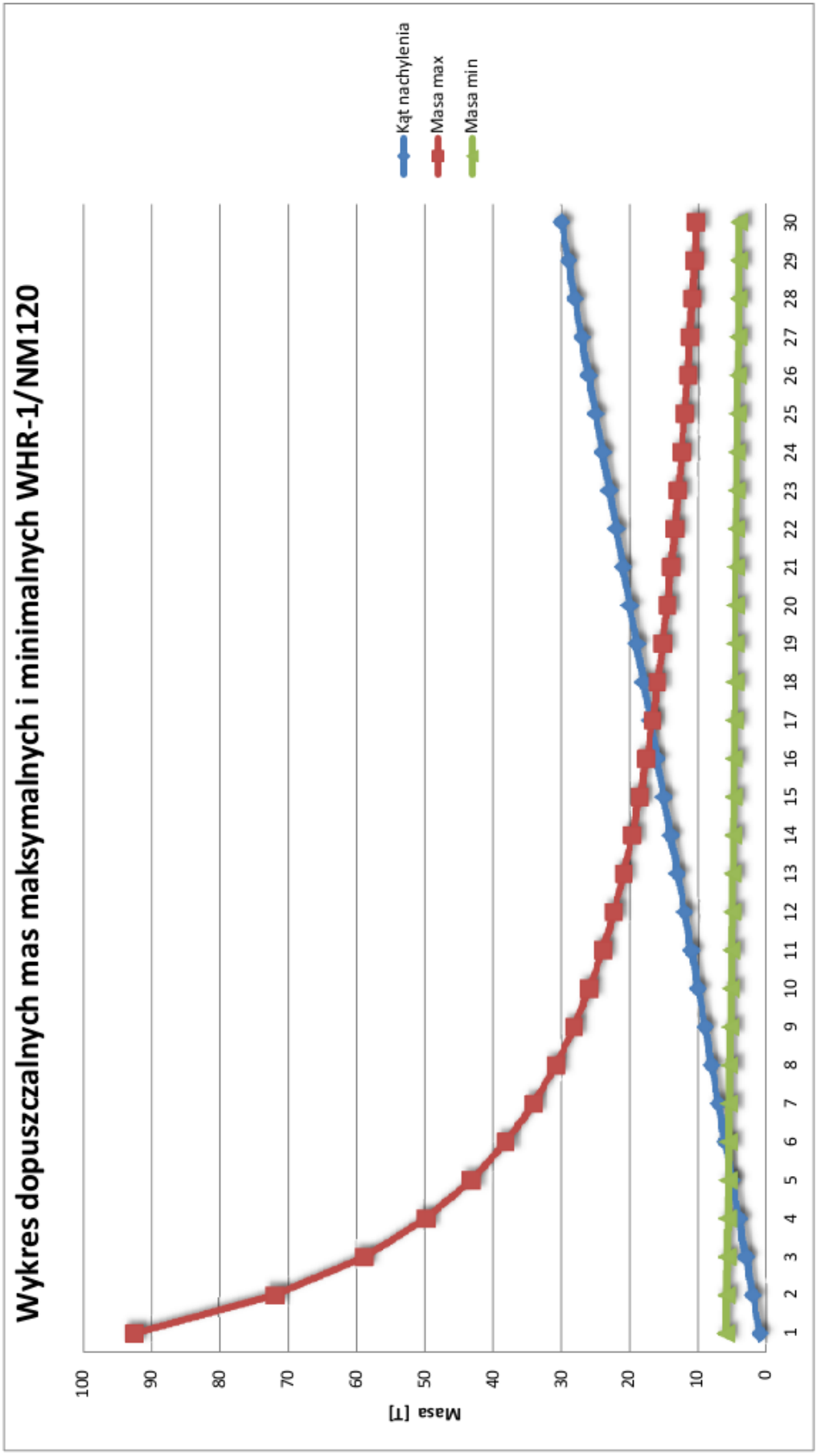
***)The value depends on the use of the trolley and the regulations in force, defined by the user at the time of ordering.**
****)Maximum gradient of the transport30° track according to the applicable regulations in the user's country.**

*****To enable special transport of extremely heavy loads it is possible to combine two or more brake trolleys in accordance with the permissible load capacity of the suspension track.**

WHR-1/NM 60kN and 80kN trolleys are compatible replacements for WHR-1/N 52kN and 78kN trolleys

1.10. Table and chart of the maximum and minimum permissible weight of the transport set for one WHR-1/NM 120kN trolley

Slope routes $\alpha\nu\delta$ [degrees].	Weight of the set (including the weight of the trolley) WHR-1/NMkN120 [kg].	
	Max	Min
1	92 583	5 960
2	71 988	5 859
3	58 881	5 762
4	49 809	5 667
5	43 159	5 576
6	38 077	5 488
7	34 067	5 403
8	30 824	5 321
9	28 148	5 241
10	25 902	5 164
11	23 992	5 089
12	22 347	5 016
13	20 917	4 946
14	19 662	4 879
15	18 552	4 813
16	17 564	4 749
17	16 679	4 687
18	15 883	4 627
19	15 162	4 569
20	14 506	4 513
21	13 908	4 459
22	13 360	4 406
23	12 857	4 355
24	12 393	4 305
25	11 964	4 257
26	11 566	4 210
27	11 197	4 164
28	10 853	4 120
29	10 532	4 078
30	10 232	4 036


Wykres dopuszczalnych mas maksymalnych i minimalnych WHR-1/NM120
Kąt nachylenia
Masa max
Masa min
Masa [T]
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

1.11.Basic technical data WHR-1/NM 150kN

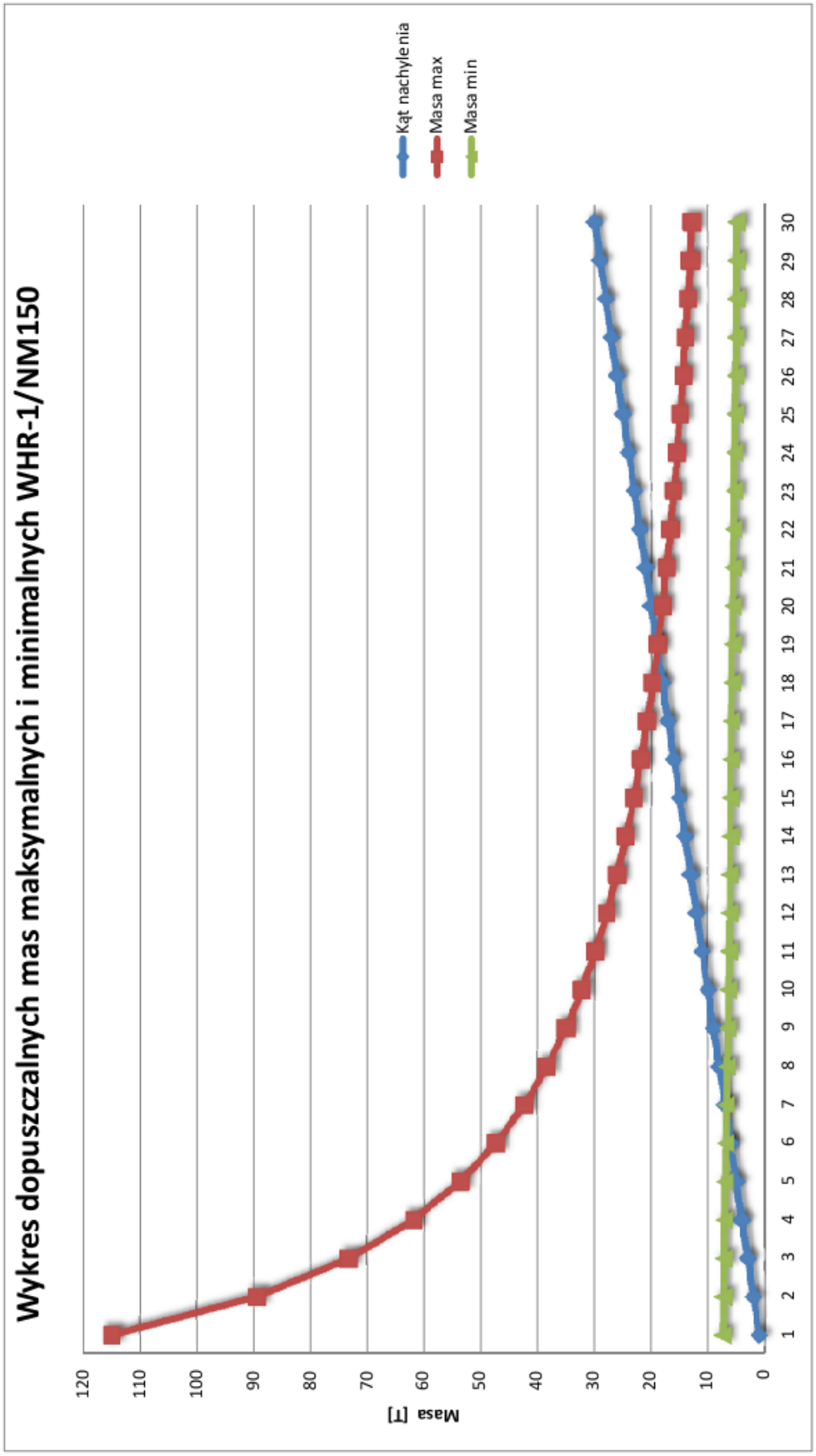
Static brake force of a trolley in WHR version - 1/NM/120	***min 150kN	***min 300kN	***min 450kN	***min 600 kN	----------
Transport unit travel speed	max. 2.5m/s	max. 2.0m/s	max. 1.8m/s	max. 1.6 m/s	---------
Brake release speed	0.8 -3.2m/s	0.8 - 2.8m/s	0.8 - 2.6 m/s	0.8 - 2.2 m/s	---------
Release time of the brake system of the trolley/combination of trolleys	max 0,3 s	max 0,7 s	max 0,7 s	max 0,7 s	---------
Brake application speed	*min. 0.8 m/s - max 6.0 m/s				
Maximum pulling-pushing force 150 kN	**also 150kN in the CRP drawbar frame or in the CP-180kN frame**				
Coupling pin diameter	min. 30 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm	min. 40 mm max. 45 mm
Unladen weight Without hooks	129 kg	2x 129 kg	3x 129 kg	4x 129 kg	8x 129 kg
Length of hydraulic lines	-	max. 60m	max. 60m	max. 60m	max. 50m
Slope of the track - material transport	max. 30°	max. 30°	max. 30°	max. 30°	max. 30°
Gradient of the track - carriage of people	**max.30°	** max.30°	0°	0°	0°
Max. pressure WHR-1/NM 150kN	$14^{+1,0}$MPa	$14^{+1,0}$MPa	$14^{+1,0}$MPa	$14^{+1,0}$MPa	$14^{+1,0}$MPa
Min. pressure WHR-1/NM 150kN	$11^{+0,5}$ MPa	$11^{+0,5}$ MPa	$11^{+0,5}$ MPa	$11^{+0,5}$ MPa	$11^{+0,5}$ MPa

*)The value depends on the use of the trolley and the regulations in force, defined by the user at the time of ordering.
**)Maximum gradient of the transport30° track according to the applicable regulations in the user's country.
***To enable special transport of extremely heavy loads it is possible to combine two or more brake trolleys in accordance with the permissible load capacity of the suspension track.

WHR-1/NM 60kN and 80kN trolleys are compatible replacements for WHR-1/N 52kN and 78kN trolleys

1.12. Table and chart of the maximum and minimum permissible weight of the transport set for one WHR-1/NM 150kN trolley

Slope routes $\alpha\nu\delta$ [degrees].	Weight of the set (including the weight of the trolley) WHR-1/NMkN150 [kg].	
	Max	Min
1	115 117	7 411
2	89 509	7 285
3	73 212	7 164
4	61 932	7 047
5	53 663	6 933
6	47 344	6 824
7	42 359	6 718
8	38 326	6 615
9	34 999	6 516
10	32 207	6 420
11	29 831	6 327
12	27 786	6 237
13	26 007	6 150
14	24 447	6 066
15	23 067	5 984
16	21 839	5 905
17	20 739	5 828
18	19 748	5 754
19	18 852	5 682
20	18 037	5 612
21	17 293	5 544
22	16 612	5 478
23	15 986	5 414
24	15 409	5 353
25	14 876	5 293
26	14 381	5 234
27	13 922	5 178
28	13 494	5 123
29	13 095	5 070
30	12 723	5 019


Wykres dopuszczalnych mas maksymalnych i minimalnych WHR-1/NM150
Kąt nachylenia
Masa max
Masa min
Masa [T]
120
110
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

2. Guide frame drawbars versions: CRP-1 and CRP-2

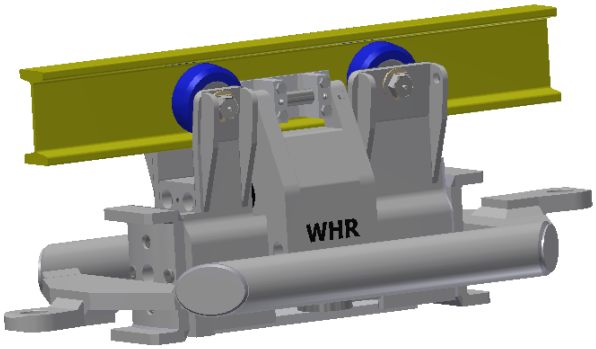
2.1.General description of the product

CRP frame drawbars are used to guide brake trolleys and to securely connect transport sets.

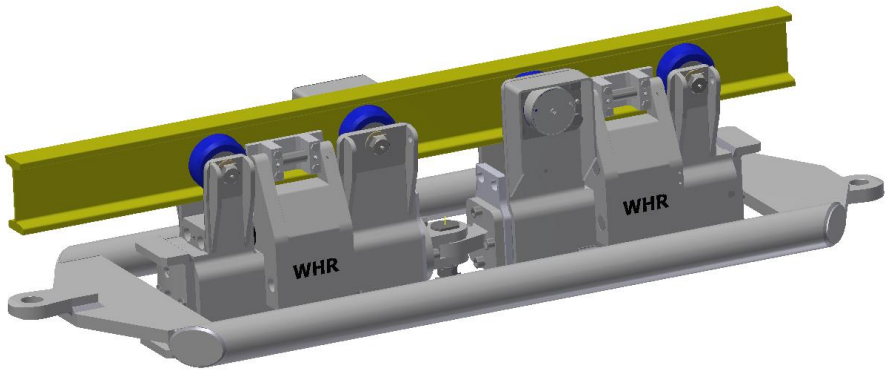
Frame drawbar CRP-1 is used to guide one brake trolley and frame drawbar CRP-2 is used to guide two brake trolleys. Brake trolleys that are guided in frames do not have any hooks to connect them with frames, only the so-called buffers.

The advantage of using frame drawbars in this way is to shorten the train, avoid damage to the hitches and brake trolley body and to avoid overloading under extreme conditions of material transport. This is the case when pushing and pulling the train on the running track.

CRP frame drawbars may be used in underground mines in non-methane and methane areas, in excavations classified as class "a", "b" or "c" methane explosion hazard and class A or B coal dust explosion hazard.

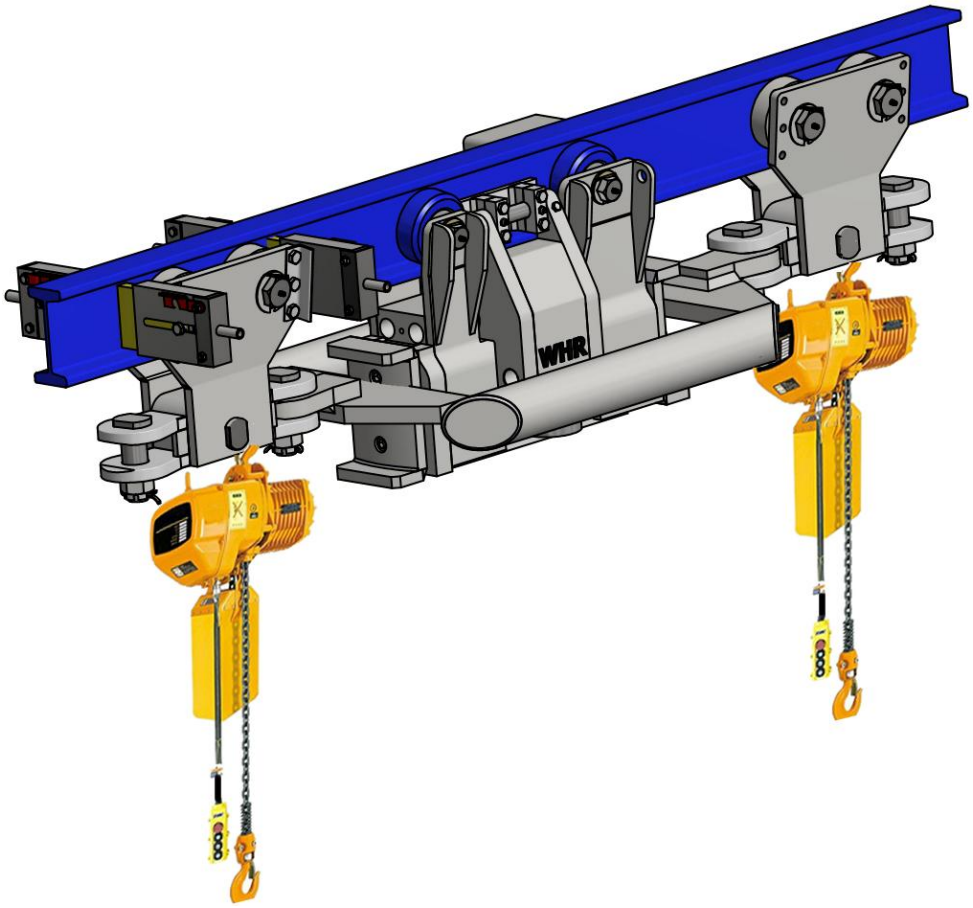


Frame drawbar rod CRP-1 for one brake trolley



Frame drawbar CRP-2 for two brake trolleys

The CRP-1 and CRP-2 transport frame drawbars can be combined with other devices that are part of the transport set (fig. below).



Example of application of WTZB transport trolleys

2.2. Technical data of CRP drawbar

No	Version	Fp [kN].	Lc [mm].	Lw [mm].	Sw [mm].	Difference levels ears [mm].	Øu [mm].	T lug minimum [mm].	Mass [kg].
1.	**CRP-1**	120	1030	600	400	0÷90	32÷46	25-35	39
2.		140	1030	600	400	0÷90	41÷46	28-35	39
3.		150	1030	600	400	0÷90	41÷46	30-35	39
4.	**CRP-2**	120	1880	1330	530	0÷90	32÷46	25-35	88
5.		140	1880	1330	530	0÷90	41÷46	28-35	88
6.		150	1880	1330	530	0÷90	41÷46	30-35	88

These CRP drawbars are suitable for SCHARF, BECKER, PIOMA, BEVEX, FERRIT, ZAMPRA, FITE, IMM, KSP, FAMA, LPS.

These CRP drawbars are suitable for guiding brake trolleys of the type: WHR-1NM, WHR-1/N, WHR-1.

3. Contact details

- e-mail:biuro@zbmdspzoo.pl
- Krzysztof Klasik tel. +48 515 797 227