ISSN 3060-4567

DETERMINATION OF THE COMPLIANCE OF CARGO WITH THE DIMENSIONS IN RAILWAY TRANSPORT AND THE PERMITTED LOADS FOR SEMI-OPEN WAGONS AND PLATFORM ELEMENTS

Bozorov R.Sh.1, Boboev D.Sh.2

1,2 – Tashkent State transport University (Tashkent, Uzbekistan).

Keywords: *Gauge, semi-open wagon, platform, permissible load, gauge limit, rolling stock, technical specifications, fastening means.*

Abstract: *The article shows the determination of the compliance of the cargo with the dimensions and the permissible loads on semi-open wagons and platform elements in railway transport during the delivery of goods. Rolling stock for freight transportation is studied, measures and proposals for their selection are developed. In addition, the technical characteristics of the main models of wagons are analyzed, and proposals are made on the permissible loads on semi-open wagons and platform elements to eliminate the shortcomings of the existing system.*

Introduction. A load loaded into a single wagon or a combination of two wagons is considered to be oversized if none of its parts, including packaging and reinforcement elements, exceeds the limits of the basic loading dimensions and the distance of the load, including packaging and reinforcement elements, from the transverse plane of symmetry of the wagon (or combination) to its ends does not exceed the values specified in Table 1.

Main part. Checking the compliance of the load with the gauge should be carried out in conditions where the wagon is located on a straight and horizontal railway section and its longitudinal vertical plane of symmetry coincides with the railway axis.

Table 1

Type of wagon or train	*Main axle distance, mm**		The largest distance from the center of the wagon to the ends of the load, mm
	Wagon	bundle	

ISSN 3060-4567

Platform	9720 14720 14400	— — —	8800 11080 10940
Two-platform connection	9720	14620	11030
Semi-open wagon	8650 (8670)	—	8225

Figure 1. Technical parts of 4-axle semi-open rolling stock models

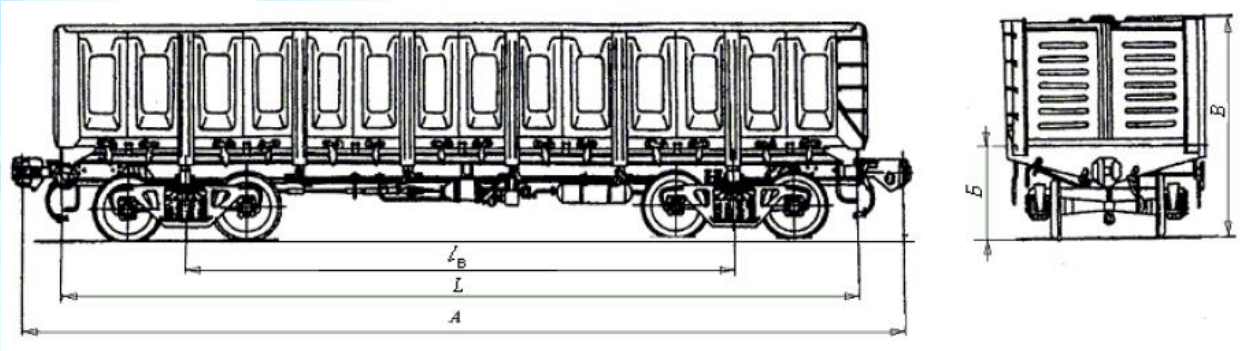

Table 2

Technical characteristics of the main models of universal semi-trailers

Technical specifications

Technical specifications	Model												
	12-1000	12-532	12-726	12-119	12-1505	12-1592	12-757	12-127	12-753	12-295	12-132	12-141	12-П153*
Load capacity, t	69	69	69	69	69	71	69	70	69	71	70	71	63
Target mass of the wagon, t	22	22,2	22	22,5	21,1	21,28	25	23,9	22,5	23,0	24,0	23,0	23,2
Static load of the wagon axle on the rails, ts	22,0	22,8	22,75	23,25	22,5	23,05	23,5	23,5	23,25	23,5	23,5	23,5	22,0
Wagon base, lв, mm	8650	8650	8650	8650	8650	8650	8670	8650	8650	8650	8650	8650	8650
Length, mm: According to the axles of the autoscoops, A According to the	13920 12700	13920 12700	13920 12700	13920 12732	13920 12700	13920 12700	13920 12800	14520 13440	13920 12802	13920 12700	13920 12780	13920 12780	14410 13190

ISSN 3060-4567

three beams of the frame, L													
Maximum height from the YTI, B, mm	3484	3484	3484	3495	3482	3492	3746	3495	3484	3295	3800	3495	3483
Body volume, m³	73	73	73	76	76	83	85	76	74	75,2	88	77	64
Height of the floor level from the YTI, B, mm	1414	1416	1416	1415	1414	1232	1423	1415	1416	1032	1415	1415	1416
Internal dimensions of the body, mm:	2878 12118 2060	2878 12118 2060	2878 12088 2060	2878 12700 2060	2878 12700 2060	2878 12700 2240	2964 12228 2315	2878 12700 2060	2878 12324 2060	2890 12690 2050	2911 12750 2365	2878 12700 2060	2850 12050 1880
Width	2530	2530	2482	—	—	—	2766	—	2530	—	—	-	2610
Length	35,4	35,5	35,4	36,55	36,55	36,55	36,63	36,55	36,15	36,67	37,125	36,55	35,4
Height	14	14	14	14	-	-	14	14	14	-	14	14	14

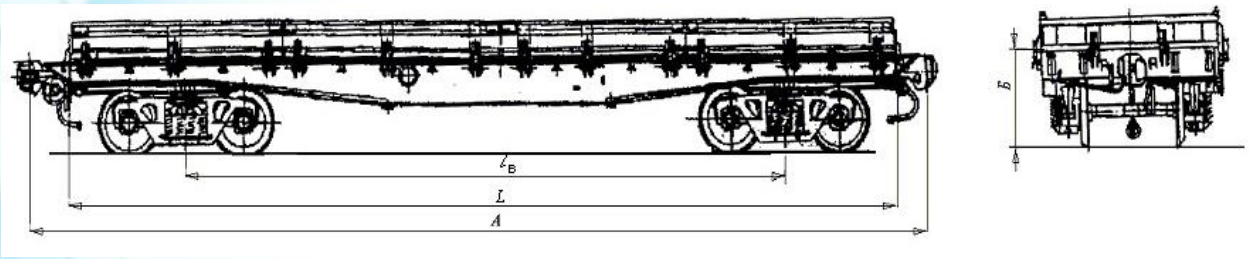

Figure 2. Technical parts of models of rolling stock on a 4-axle platform

Table 3

Technical specifications	Model					
	13-401	13-4012	13-4019	13-H451	13-491	13-926
Load capacity, t	70	71	70	63	66,5	73
Tare weight of the wagon, t	20,92	21,4	21,9	21,3	26,25	27,0
Static load of the wagon axle on the rails, t.s	22,73	23,25	22,97	21,1	23,25	25,0
Wagon base, lв, mm	9720	9720	9720	9720	14400	14400
Length, mm:	14620 13400	14620 13400	14620 13400	14620 13400	19620 18400	19620 18400

ISSN 3060-4567

Along the axles of the auto-scoop, A	1310	1310	1320	1310	1310	1304
Along the end beams of the frame, L	13300 2770	13300 2770	13300 2770	13300 2770	18300 2760	18300 2830
Floor height from UGR, B, mm	13400 2870	13400 2870	13400 2870	13400 2870	18400 2860	18400 2930
Internal dimensions of the body, mm:	36,8	36,8	36,8	36,8	52,5	54
Length	8	8	8	8	12	12
Width	16	16	16	16	24	24

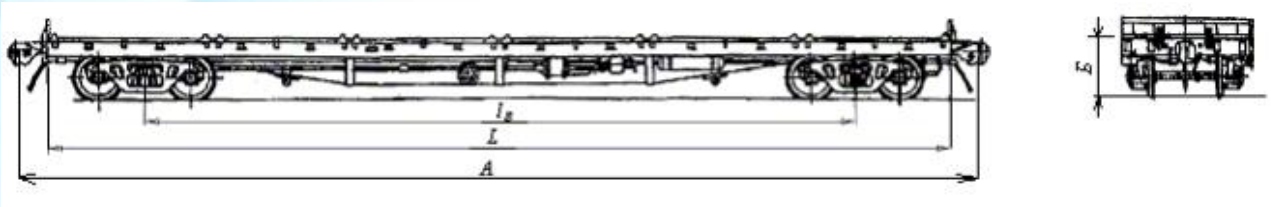

Figure 3. Platforms for 4-axle large-tonnage containers

Table 4

Technical characteristics	Model					
	13-470 without boards	13-9004* front-mounted	13-9007* front-mounted	13-935* front-mounted	13-935A without boards	13-4085* onboard
Load capacity, t	60	65	68	73	71	72
Tare weight of the wagon, t	22	26	25,2	27	23	22
Static load of the wagon axle on the rails, t.s	20,5	22,75	23,3	25	23,5	23,5
Wagon base, lв, mm	14720	14720	13900	14400	14400	9720
Length, mm:	19620 18400	19620 18400	19620 18400	19620 18400	19620 18400	14620 13400
Along the axles of the auto-scoop, A	1275	1322	1395	1304	1304	1310
Along the end beams of the frame, L	18400 2500	18300 2870	18300 2870	18300 2870	18400 2930	13380 2870

ISSN 3060-4567

Floor height from UGR, B, mm	20 4	24 –	20 –	24 –-	24 –	12 –
Floor dimensions, mm:	–	10	14	24	–	16

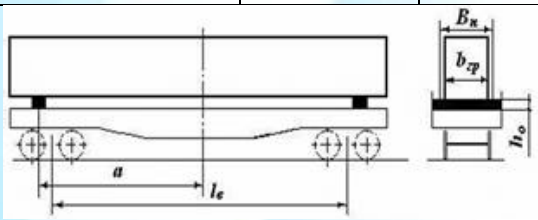

Figure 4. Loading of the load onto two pallets located outside the platform base

Table 5.

Load per pallet, t.s	Maximum permissible distance a (mm) according to load distribution width Bn (mm)		
	880	1780	2700
≤ 12,5	6250	6350	6400
15,0	6000	6050	6150
20,0	5600	5650	5750
25,0	5400	5450	5550
30,0	5370	5420	5520
33,0	5350	5400	5500
36,0	5330	5380	5500

Table 6.

Universal platform details and nodes	Permitted power, tc
Standoff ring: riveted	2,5
- welded casting	5,0
Depending on the angle of extension of the support at the end of the platform:	
Cast	
90°	6,5
45°	9,1
- Welded	
90°	10,0
45°	14,2

Platform tie-down device	7,5
Details and components of a platform for transporting wheeled equipment	
Welded ring made of strip Welded cast rack ring	4,0 5,0

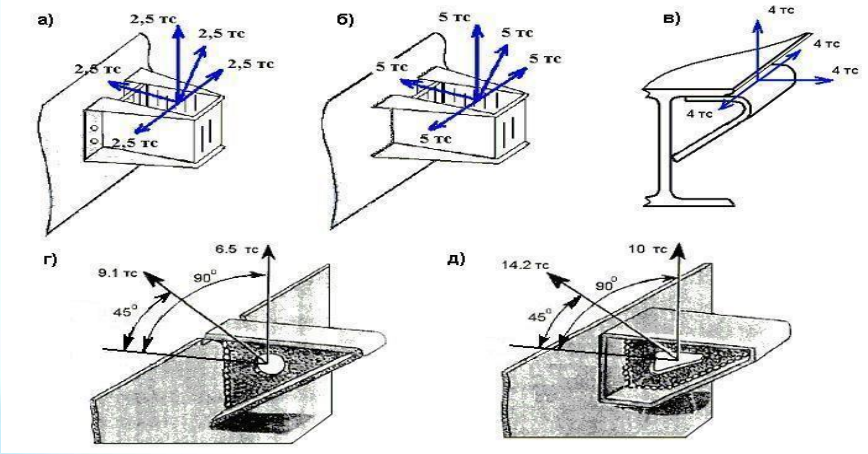

Figure 5. Permissible loads on the support rings and end support brackets of universal platforms

a – for riveted ring; b – for welded cast ring; c – for welded ring made of strip; d – for cast support bracket; d – for welded support bracket

The permissible loads on the metal sides of universal platforms built after 1964 (Figure 6) are given in Table 6..

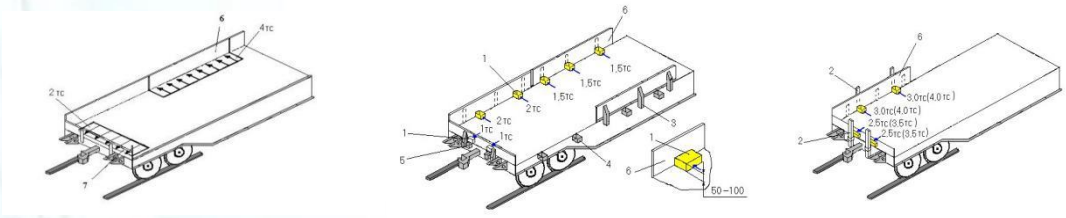

Figure 6. Attachment points and fastening devices to the wagon body

1 – Support beam; 2 – Short support (wooden or metal); 3 – Wedge lock; 4 – Side strut ring; 5 – End strut ring; 6 – Side board section; 7 – End board.

The permissible loads for the coupling devices of semi-trailers are given in Table 7.

Table 7

ISSN 3060-4567

Binding device	Loading capacity, tc, for semi-trailers	
	Until 1974	After 1974
Upper outer and inner Middle Lower External tie-down device on the three-beam	1,5 2,5 5,0 5,0	2,5 3,0 7,0 7,0

It is not allowed to load the upper and middle lashing devices on the same support at the same time.

Conclusion. It is not allowed to fasten the tensioners and ties to other parts of the wagon body, including wooden brackets, fastening rings located on the upper connecting beam of the semi-car, as well as to the rings on the outer surface of the platform side sections. It is allowed to use wire tensioners and ties consisting of several components or combined tensioners and ties consisting of various types of tensioners and ties. The strength of the connecting elements of such tensioners and ties must not be less than the strength of the individual components. Ties on the platforms are fastened to the supporting brackets located opposite.

REFERENCES

1. Bozorov R.Sh., Saidivaliev Sh.U., Shermatov E.S., Boboev D.Sh. Research on establishing the optimal number of platforms in a container train. Transport: science, technology, management. Scientific information collection. 2022. No. 5. P. 24-28.
2. Diyor Shomuratovich Boboev, Ramazon Shamilovich Bozorov, Elbek Sirojiddinovich Shermatov. Choose types of transport and improve their cooperation in the process of delivery of cargo. " Economy and society " №5(84), 2021, 98-105.
3. Ziyoda Mukhamedova, Diyor Boboev. Research on improving the modern transport system in the process of cargo delivery. Railway transport: current issues and innovations, 3(1), 2022/3/28, 15–24.
4. Jamol Shikhnazarov, Diyor Boboev. Analysis of the effective use of wagons in the process of freight delivery in railway transport. Academic research in educational sciences, 2(5), 2021, 210-216.

ISSN 3060-4567

5. Jamol Shihnazarov, Diyor Boboev, Elbek Shermatov. Investigation of the longitudinal forces acting during the transportation of flat cargo on sites in the road profiles with a slope of railway transport. AIP Conference Proceedings, 2432(1), 2022/6/16, 030112.

6. Diyor Shomurotovich Boboyev. Organization of innovative technology of cargo transportation through counter-trailer terminals. Innovative research in the modern world: Theory and practice, 1(12), 2022/4/15, 11-19.

7. Z.G. Muhamedova, D.Sh. Boboyev. Research on the improvement of modern transportation systems in the process of cargo delivery. Railway Transport,1(16),2022,16-19.

8. Zhamshid Renatovich Kobulov, Zhamshid Saifullaevich Barotov, Diyor Shomurotovich Boboev. Improving the freight transportation system on rail transport with wagon shipments. Current issues in economics and management: science and practice. Kriulinsky readings. Collection of materials of the All-Russian scientific and practical conference. Kursk, 15.05.2021, 199-203.

9. Jamshid Renatovich Kobulov, Jamshid Sayfullayevich Barotov, Diyor Shomurotovich Boboyev. Improvement of the cooling system during storage in the process of agricultural products. Journal of Tashkent Institute of Railway Engineers. 16(2), 2020, 200-204.