

## SYSTEM OF ELECTRIFICATION

	Specification	Value	Measuring unit	Permitted deviation	
				Class I	Class II
1.	Voltage of electrical overhead wire				
1.1	Voltage of electrical overhead wire***	25 000	V	+10% -24%	+10% -24%
1.2	Nominal voltage of electrical overhead wire***	25 000	V		
1.3	Minimum continuous voltage (Umin1) ***	19000	V		
1.4	Minimum non-continuous voltage (Umin2)***	17500	V		
1.5	Maximum continuous voltage (Umax1)***	27500	V		
1.6	Maximum non-continuous voltage (Umax2)***	29000	V		
2.	Frequency of electrical overhead wire				
2.1	The frequency of input power of current supply ***	50	Hz	±2	±2
2.2	Frequency of the electric traction system in 99,5% of a year period ***	50	Hz	±1	±1
2.3	Frequency of the electric traction system in 100% of a year period ***	50	Hz	+4/-6 %	+4/-6 %
3.	Minimum height dimension of electrical overhead wire above rail level: above level crossings: 6000 mm	5050**	mm	+20 -0	+20 -0
4.	Minimum height dimension of electrical overhead wire above level crossings	6000	mm	+20 -0	+20 -0
4.2	Minimum height dimension of electric overhead wire above level crossings in case of an electric overhead wire system built, in case of derogation made by railway authority****	5700	mm	+20 -0	+20 -0
5.	Maximum height dimension of electrical overhead wire above rail level	6150	mm	+0 -20	+0 -20
6.	Staggering of electrical overhead wire: ±300 mm	±300	mm	±10	±30
7.	Staggering of electrical overhead wire built before 1992 (tolerated value)	±400	mm	±10	±30
8.	Maximum permissible height lift of overhead wire during the passage of pantograph	120	mm		
9.	Pre-sag of wire	0	mm		
10.	Pantograph (static) contact force	75	N	±5	±5
11.	Section insulator - Permitted height difference of overhead wire connection		mm	±5	±15

\* In compliance with National Railway Regulation, Volume I (on the basis of Decree 103/2003 (XII. 27.) GKM)

\*\*National Railway Regulation Volume I (on the basis of Decree 103/2003 (XII. 27.) GKM for overhead wire networks not having a derogation for overhead wire height in level crossings given by the railway authority.

\*\*\*In compliance with MSZ EN 50163 Standard for railway lines that are under the scope of EU Regulation 1301/2014/EU

\*\*\*\*In compliance with MSZ EN 50119 Standard in case of electric overhead wire systems having a derogation for overhead wire height in level crossings given by the railway authority

## \*\*\*\*\* Exceptions:

The height of the overhead wire

- a) in the Budapest Déli pu. tunnel in sections 14-17 at Kis-Gellért-hegy object above left track is 4800 mm
- b) in the Budapest Déli pu. tunnel in sections 14+00 - 17+00 at Kis-Gellért-hegy object above right track 4850 mm
- c) on the tracks of Budapest Déli at road overpass at Márvány utca some tracks under the bridge at Márvány utca in sections 6+00 - 7+00 4980 mm
- d) On line between Budapest-Nyugati - Városliget elágazás in sections 19+75 - 20+25 at \_100/1\_19+70/SZ1 Signal bridge new object, under the Signal bridge (Western section) above left track 4970 mm
- e) on line between Budapest-Nyugati - Városliget elágazás in sections 19+75 - 20+25 at \_100/1\_19+70/SZ1 Signal bridge new object, under the Signal bridge (Western section) above right track 5010 mm
- f) on the Debrecen - Apafa line in sections 2230+41 - 2230+42 at Db. Vágóhíd utca road overpass, under Road overpass (Diószegi bridge) above right track 4970 mm
- g) on Kelenföld - Háros line in sections 36+24 - 36+12 at road overpass by Bpest Kitérő út, under road bridge above left track 4960 mm
- h) on Kelenföld - Háros line in sections 36+24 - 36+12 at road overpass by Bpest Kitérő út, under road bridge above right track 5010 mm
- i) on Kelenföld - Háros line in sections 36+06 - 36+12 at Kitérő út villamos felüljáró 1 object, under BKV bridge above left track 4980 mm
- j) on Kelenföld - Háros line in sections 36+06 - 36+12 at Kitérő út villamos felüljáró 1 object, under BKV bridge above right track 5040 mm
- k) Novajidrány - Hidasnémeti section 557+62 and 558+20 Hidasnémeti Perényi u. kfv under the Road Bridge on single track 5030 mm
- l) in Rákosszentimre in sections 29+00 - 30+00 at road overpass by Kacsóh Pongrácz út road crossing (Rákosszentimre - Városliget) 5030 mm
- m) in Sárvar in sections 906+00 - 907+00 at road overpass 84150 main road, under road bridge 4960 mm
- n) on Székesfehérvár - Szabadbattyán line in sections 684+98 - 685+98 at road overpass Vásártér út, under Homokos overpass above right track 5034 mm
- o) on Szentendre - Csurgó line in sections 877+80 és 878+80 at main road 6801, Csurgó road overpass object, under road bridge single track 5040 mm
- p) in Tüskevár in sections 999+00 - 1000+00 at main road 8., Tüskevár road overpass object, under road bridge 5020 mm.

All the electrified lines on the railway network of MÁV Zrt are rated as Class I.

### Voltage of the electrical overhead wire in electrified border crossings

MÁV Zrt.

	Name of the border crossing	Infrastructure Managers	Voltage/frequency of the overhead wire	
			MÁV Zrt	Next IM
1.	Hegyeshalom - Nickelsdorf	MÁV/ÖBB	25 kV/50 Hz	15 kV/16 2/3 Hz
2.	Gyékényes - Koprivnica	MÁV/HŽ	25 kV/50 Hz	25 kV/50 Hz
3.	Kelebia - Subotica	MÁV/ŽS	25 kV/50 Hz	25 kV/50 Hz
4.	Lőkösháza - Curtici	MÁV/CFR	25 kV/50 Hz	25 kV/50 Hz
5.	Hidasnémeti - Cana	MÁV/ŽSR	25 kV/50 Hz	3 kV DC
6.	Szob - Sturovo	MÁV/ŽSR	25 kV/50 Hz	25 kV/50 Hz
7.	Komárom - Komarno	MÁV/ŽSR	25 kV/50 Hz	25 kV/50 Hz
8.	Óriszentpéter - Hodoš	MÁV/SŽ	25 kV/50 Hz	25 kV/50 Hz

GYSEV Zrt.

	Name of the border crossing	Infrastructure Managers	Voltage/frequency of the overhead wire	
			GYSEV Zrt.	Next IM
1.	Sopron - Baumgarten	GYSEV	25 kV/50 Hz	25 kV/50 Hz
2.	Harka - Deutschkreutz	GYSEV/ÖBB	25 kV/50 Hz	25 kV/50 Hz
3.	Fertőszentmiklós - Pamhagen	GYSEV	25 kV/50 Hz	25 kV/50 Hz
4.	Rajka - Rusovce	GYSEV/ŽSR	25 kV/50 Hz	25 kV/50 Hz