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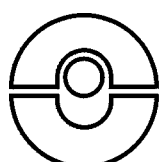
1st edition, June 2000

Translation

Characteristics of direct-current overhead contact systems for lines worked at speeds of over 160 km/h and up to 250 km/h

*Caractéristiques des caténaires alimentées en courant continu pour les
lignes parcourues à des vitesses jusqu'à 250 km/h*

*Kenndaten für Oberleitungen mit DC-Versorgung für Strecken, die mit Ge-
schwindigkeiten bis 250 km/h befahren werden*



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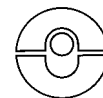
VII - Way and Works

Application :

With effect from 1st January 1999

All members of the International Union of Railways

The person responsible for this leaflet is named in the UIC Code



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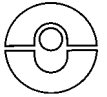


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Summary

The leaflet contains the requirements and recommendations required to ensure reliable interaction between pantographs and 1500 V and 3000 V dc overhead equipment for lines operated at speeds of over 160 km/h as well as the parameters for qualification of pantograph-OHL interaction and definition of the interaction qualification indicator.

The values recommended reflect the state of the art and experience gained by the railways in the field of high speed rail whilst ensuring reliability and cost effectiveness.

A section is devoted to simulation programs and measurement methods and includes suggestions on criteria to assess the validity of simulation models used, details about measurement of the contact force and measurement of electric arcs.

The basic OHL parameters stipulated or recommended as well design parameters including those relating to conductors and the physical parameters given for the three speed ranges in km/h: $160 \leq V \leq 200$, $200 < V \leq 220$ and $220 < V \leq 250$, are set out so that these requirements may be applied to existing dc lines belonging to the European High Speed Network.

The basic parameters stipulated or recommended for OHL are classified into static, dynamic, electrical and climatic parameters.

The design parameters to be observed such as the design of supports, contact wire uplift at the support, sag at the reference temperature, permissible lateral deflection of the contact wire with maximum side wind, the number of spans per changeover of tensioning, contact wire run-in at switches and contact wire tensioning are important for the OHL to function properly at high speed.



1 - General

1.1 - Leaflet content

This leaflet contains requirements and recommendations to ensure reliable interaction between pantograph and direct-current overhead lines at speeds of over 160 km/h and up to 250 km/h.

The recommendations issued in leaflet are in line with the state-of-the-art and reflect the experience gained by the railways in high-speed transport taking account of reliability and cost factors.

Account has been taken in this leaflet of the provisions covering international traffic as laid down in the Technical Specifications for Interoperability (TSI) (see “List of abbreviations”, on page 20). These may be supplemented by the national laws and regulations specific to each railway.

The OHL characteristics set out in this leaflet can be used in conjunction with the bow profile defined in *UIC Leaflet 794-1*.

1.2 - Scope

Direct-current networks comprise lines suitable for a mix of very different speeds. Technological progress has seen speeds increase from the modest levels of the first systems to around 200 km/h for upgraded lines of the European high-speed network and even to 250 km/h, the highest speed currently used in revenue operations.

The speed ranges shown in the tables reflect the general features of OHL (see “List of abbreviations”, on page 20) equipment and experience gained by the railways.

The aim is to ensure that existing lines forming part of the European high-speed network comply with these requirements.



1.3 - Symbols

Symbol	Name
α	Doppler effect
χ	Amplification factor
σ	Standard deviation
$e_{\max}$	Maximum compliance (electricity)
$e_{\min}$	Minimum compliance (electricity)
$F_{\max}$	Maximum permissible dynamic contact force of pantograph
$F_{\min}$	Minimum permissible dynamic contact force of pantograph
m_{fd}	Specific mass of contact wire
m_{ts}	Specific mass of messenger wire
U	Degree of variability
r	Reflection factor
V_b	Design speed
V_c	Wave propagation speed
Z_{fd}	Tensile load in contact wire
Z_{ts}	Tensile load in messenger wire

1.4 - Definitions

1.4.1 - Speed ranges

The OHL characteristics are sub-divided into three speed ranges:

$160 < V \leq 200$ km/h,

$200 < V \leq 220$ km/h,

$220 < V \leq 250$ km/h

1.4.2 - Voltages

The parameters given in this leaflet are valid for 1500V and 3000V systems.

1.4.3 - Rolling stock profile

The requirements and recommendations contained in this leaflet apply to rolling stock complying with the "GC" gauge profile.