

CALIFORNIA HIGH-SPEED TRAIN

System Requirements Database Report

Program

List of CHSTP System Requirements grouped by Package

August 2010



California High-Speed Rail Authority



California High-Speed Train Project




SYSTEM REQUIREMENTS DATABASE REPORT

List of CHSTP System Requirements grouped by Package

Database report name: rpt_List_of_SRs_grouped_by_Package

Report generated: 8/3/2010 3:41:15 PM

Prepared by  for the California High-Speed Rail Authority

The logo consists of the letters 'PB' in a large, bold, sans-serif font. Below the 'PB' are the words '100 YEARS' in a smaller, bold, sans-serif font.

Package: 01

3-06	Minimum radius of curvature
3-07	Actual Superelevation (Ea)
3-08.1	Unbalanced Superelevation on plan track and on the through route of switches and crossings
3-08.2	Abrupt change of unbalanced superelevation on diverging track of switches

Package: 02

3-02	Nominal track gauge
3-03	Minimum infrastructure gauge
3-04	Distance between track centers
3-05	Maximum rising and falling gradients

Package: 03

3-20.1	Access to the platform
3-20.2	Usable length of the platform
3-20.3	Usable width of the platform
3-20.4	Platform height

Package: 04

5-02	Structure and mechanical parts
5-02.2	End couplers and coupling arrangements to rescue trains
5-02.9	External steps for use by shunting staff

Package: 05

5-07.1	Emergency exits
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Package: 06

5-06.8	Exterior noise
5-07.6	Interior noise

Package: 07

3-09	Equivalent conicity
3-09.1	Definition
3-09.2	Design values
3-09.3	In service values
3-11	Rail inclination
3-18	Electrical characteristics
3-37	The rail
3-37.1	Railhead profile
3-37.2	Design linear mass
3-37.3	Steel grade
3-38	The rail fastening systems
3-39	Track sleepers and bearers
3-40	Switches and crossings
3-45	Derailment Containment
3-47	Welding of Rail
3-51	Rail Joints
3-52	Rail Mismatch

3-53	Torch Cut Rail
3-54	Derails
3-55	Track qualification by vehicle

Package: 08

3-14.1	Vertical loads
3-14.2	Dynamic analysis
3-14.3	Centrifugal forces
3-14.4	Nosing forces
3-14.5	Actions due to traction and braking (longitudinal loads)
3-14.6	Longitudinal forces due to interaction between structures and track
3-14.7	Aerodynamic actions from passing trains on line side structures
3-14.8	Application of the requirements of EN1991-2:2003

Package: 09

3-16.1	General requirements
3-16.2	Piston effect in underground stations
3-17	Effect of crosswinds
3-19	Noise and vibration
3-19.1	Noise mitigation
3-19.2	Vibration mitigation
3-27	Ballast pick-up

Package: 10

5-09	Servicing
5-09.1	General
5-09.2	Train external cleaning facilities
5-09.3	Toilet discharge system
5-09.4	Train interior cleaning
5-09.5	Water restocking equipment
5-09.6	Sand restocking equipment
5-09.7	Special requirements for stabling of trains
5-09.8	Refueling equipment

Package: 11

3-26.1	Toilet discharge
3-26.2	Train external cleaning facilities
3-26.3	Water restocking equipment
3-26.4	Sand restocking equipment
3-26.5	Refueling
3-41	Water filling connector

Package: 12

3-35	Infrastructure - Professional competences
4-14	Tunnels - Professional qualifications
4-14.1	Tunnels - Tunnel specific competence of the train crew and other staff
5-14.42	Rolling Stock - Professional competencies
7-11.1	Operations - Professional competence

7-11.2	Operations - Linguistic competence
7-11.3	Operations - Initial and ongoing assessment of staff
8-23	TCC - Professional competences

Package: 13

3-24	Distance Markers
3-25	Storage, yard, and connecting tracks and other locations with very low speed

Package: 14

3-12	Switches and crossings
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Package: 15

3-20.5	Distance from the centre of the track
3-20.6	Track layout along the platforms
3-20.7	Prevention of electric shock on platforms
3-20.8	Characteristics linked to the access of people with reduced mobility

Package: 16

7-03.2	Identification of trains
7-03.3	Train departure
7-03.4	Traffic management
7-03.5	Data recording
7-03.6	Degraded operation
7-03.7	Managing an emergency situation
7-03.8	Aid to train crew in the event of an incident or of a major rolling stock malfunction

Package: 17

7-02.1	Train visibility
7-02.2	Train audibility
7-02.3	Vehicle identification
7-02.4	Requirements for Passenger vehicles
7-02.5	Train composition
7-02.6	Train braking
7-02.7	Ensuring that the train is in running order

Package: 18

4-13.2	Tunnels - Maintenance of rolling stock
5-10	Maintenance
5-10.1	Responsibilities
5-10.2	The maintenance file
5-10.3	Management of the maintenance file.
5-10.4	Management of maintenance information.
5-10.5	Implementation of the maintenance
5-14.41	Rolling Stock - Maintenance rules
8-22	TCC - Maintenance rules

Package: 20

3-01	Infrastructure General provisions
3-21	Fire safety and safety in railway tunnels

3-42	ADA Accessibility Requirements for Infrastructure
4-02	Subsystem Infrastructure
4-02.1	Installation of switches and crossings
4-02.10	Emergency communication
4-02.11	Access for rescue services
4-02.12	Rescue areas outside tunnels
4-02.13	Water supply
4-02.2	Prevent unauthorized access to emergency exits and equipment rooms
4-02.3	Fire protection requirements for structures
4-02.4	Fire safety requirements for building material
4-02.5	Fire detection
4-02.6	Facilities for self-rescue, evacuation and rescue in the event of an incident
4-02.7	Escape walkways
4-02.8	Emergency lighting on escape routes
4-02.9	Escape signage

Package: 21

7-01.1	Operations - General requirements (staff)
7-01.2	Operations - Required Reference Material for Train and Engine Crews
7-01.3	Operations - Required Reference Material for Railroad Staff other than Train and Engine Employees
7-01.4	Operations - Documentation for Infrastructure Manager's staff authorizing train movements
7-01.5	Operations - Safety-related communications between train crew, other Railway Undertaking staff and staff authorizing train movements

Package: 23

3-33	Infrastructure - Operating rules
3-33.1	Infrastructure - Execution of works
3-33.2	Infrastructure - Notices given to railway undertakings
3-33.3	Infrastructure - Protection of workers against aerodynamic effects
4-12	Tunnels - Operating rules
4-12.1	Tunnels - Checking the condition of trains and appropriate actions
4-12.2	Tunnels - Emergency rule
4-12.3	Tunnels - Tunnel emergency plan and exercises
4-12.4	Tunnels - Earthing procedures
4-12.5	Tunnels - Timetable Special Instructions (TTSI)
4-12.6	Tunnels - Co-ordination between tunnel control centers
5-14.40	Rolling Stock - Operating rules
6-31.1	Energy - Management of power supply in case of danger
6-31.2	Energy - Execution of works
6-31.3	Energy - Day-to-day management of power supply
6-33	Energy - Professional competences
7-09	Operations - Operating rules

Package: 24

3-36	Infrastructure - Health and safety conditions
4-15	Tunnels - Health and safety conditions
5-14.43	Rolling Stock - Health and safety conditions
6-34	Energy - Health and safety conditions

6-34.2	Energy - Protective provisions of overhead contact line system
6-34.3	Energy - Protective provisions of current return circuit
6-34.4	Energy - Other general requirements
6-34.5	Energy - High Visibility Clothing
7-12	Operations - Health and Safety Conditions
7-12.1	Operations - Introduction
7-12.2	Operations - Recommended criteria for approval of occupational doctors and medical organizations
7-12.3	Operations - Criteria for approval of psychologists involved in psychological assessment and psychological assessment
7-12.4	Operations - Medical examinations and psychological assessments
7-12.5	Operations - Medical requirements
7-12.6	Operations - Specific requirements regarding the task of driving a train
7-13	Operations - Health and safety conditions
8-24	TCC - Health and safety conditions

Package: 25

5-03	Track interaction and gauging
5-03.1	Kinematic gauge
5-03.10	Sanding
5-03.11	Ballast pick up
5-03.2	Static axle load
5-03.3	Rolling stock parameters which influence ground based train monitoring systems
5-03.4	Rolling stock dynamic behavior
5-03.5	Maximum train length
5-03.6	Maximum gradients
5-03.7	Minimum curve radius
5-03.8	Flange lubrication
5-03.9	Suspension coefficient

Package: 26

5-06	Environmental conditions
5-06.1	Environmental conditions
5-06.2	Train aerodynamic loads in open air
5-06.3	Aerodynamic loads on track workers at the line side
5-06.4	Aerodynamic loads on passengers on a platform
5-06.5	Pressure loads in open air
5-06.6	Crosswind
5-06.7	Maximum pressure variations in tunnels
5-06.9	Exterior electromagnetic interference

Package: 27

8-13	ATC DMI (Driver Machine Interface)
8-14	ATC and Voice Radio DMI (Driver Machine Interface)

Package: 28

3-10	Track Geometrical Quality and limits on isolated defects
3-13	Track resistance (category I and II)
3-15	Global track stiffness

Package: 29

4-04	Subsystem control-command and signaling
4-04.1	Hot axle box detectors
8-01	TCC safety characteristics relevant to interoperability
8-02	On-board ATC functionality
8-03	Wayside ATC functionality
8-04	ATC, Voice and Other Data Radio Subsystem Functions
8-05	ATC radio air gap interfaces
8-06	On-Board Interfaces Internal to TCC
8-06.2	ATC Data Radio
8-06.3	Odometry
8-08	ATC Key Management
8-09	ATC-ID Management
8-10	HABD (Hot axle box detector)
8-11	Compatibility with Wayside Train Detection Systems
8-16	Visibility of wayside TCC objects
8-16.1	Wayside Signals
8-16.2	Wayside Signs

Package: 30

4-05.1	Material properties for rolling stock
4-05.10	Switching off of air conditioning in the train
4-05.2	Fire extinguishers for passenger rolling stock
4-05.4	Fire barriers for passenger rolling stock
4-05.5	Additional measures for running capability of passenger rolling stock with a fire on board:
4-05.6	On board fire detectors
4-05.9	Emergency lighting system in the train
5-07	System protection
5-07.10	Monitoring and diagnostic concepts
5-07.11	Particular specification for tunnels
5-07.12	Emergency lighting system
5-07.13	Software
5-07.14	Driver-Machine-Interface (DMI)
5-07.15	Vehicle identification
5-07.2	Fire safety
5-07.3	Protection against electric shock
5-07.4	External lights and horn
5-07.5	Lifting/rescue procedures
5-07.7	Air conditioning
5-07.8	Driver's vigilance device
5-07.9	Control-command and signaling system

Package: 31

5-01.1	Introduction
5-01.2	Design of trains
5-02.1	General

- 5-02.5 Toilets
- 5-02.6 Driver's cab
- 5-02.8 Storage facilities for use by staff

Package: 32

- 5-08 Traction and electrical equipment
- 5-08.1 Traction performance requirements
- 5-08.2 Traction wheel/rail adhesion requirements
- 5-08.3 Functional and technical specification related to the electric power supply

Package: 33

- 4-03.1 Segmentation of overhead line or conductor rails
- 4-03.2 Overhead line or conductor rail earthing
- 4-03.3 Electricity supply
- 4-03.4 Requirements for electrical cables in tunnels
- 4-03.5 Reliability of electrical installations
- 6-01 General provisions
- 6-02 Voltage and frequency
- 6-03 System performance and installed power
- 6-04 Regenerative braking
- 6-21 Phase separation sections
- 6-22 System separation sections
- 6-22.1 General
- 6-22.2 Pantographs raised
- 6-22.3 Pantographs lowered

Package: 34

- 6-07 Continuity of power supply in case of disturbances
- 6-20 Current capacity, DC systems, trains at standstill
- 6-23 Electrical Protection Coordination Arrangements
- 6-24 Effects of DC operation on AC systems

Package: 35

- 6-05 Harmonic emissions towards the power utility
- 6-06 External electromagnetic compatibility
- 6-08 Protection of the environment

Package: 36

- 8-07 Trackside Interfaces Internal to TCC
- 8-07.1 Functional interface between RBCs
- 8-07.2 Technical interface between RBCs
- 8-07.3 ATC Radio Block Controlling
- 8-07.4 Eurobalise/LEU
- 8-07.5 Euroloop/LEU
- 8-07.6 Requirements on pre-fitting of ATC wayside equipment
- 8-15 Interface to Data Recording for Regulatory Purposes
- 8-29 Interlocking Functions

Package: 37

5-02.4 Access

Package: 38

5-04 Braking

5-04.1 Minimum braking performance

5-04.2 Brake wheel/rail adhesion demand limits

5-04.3 Brake system requirements

5-04.4 Service braking performance

5-04.5 Eddy current brakes

5-04.6 Protection of an immobilized train

5-04.7 Brake performance on steep gradients

5-04.8 Brake requirements for rescue purposes

Package: 39

6-09 Overhead contact line

6-09.1 OCS Overall design

6-09.2 Geometry of overhead contact line

6-12 Contact wire wave propagation speed

6-14 Static contact force

6-15 Mean contact force

6-16 Dynamic behavior and quality of current collection

6-16.1 Dynamic behavior and quality of current collection - Requirements

6-16.2 Dynamic behavior and quality of current collection - Conformity Assessment

6-17 Vertical movement of the contact point

6-19 Pantograph spacing used for the design of the overhead contact line

Package: 40

8-12.1 Internal TCC Electromagnetic compatibility

8-12.2 Electromagnetic Compatibility between Rolling Stock and Control-Command Track-side equipment

Package: 41

4-05.11 Escape design of passenger rolling stock

4-05.12 Rescue service's information and access

4-05.3 Fire protection for freight trains

4-05.7 Communication means on trains

4-05.8 Emergency brake override

5-05.1 Public address system

5-05.2 Passenger information signs

5-05.3 Passenger alarm

Package: 42

3-22 Access to or intrusion into line installations

3-23.1 Lateral space alongside tracks

3-23.2 Escape walkways in tunnels

Package: 45

6-10 Compliance of the overhead contact line system with infrastructure gauge

6-11	Contact wire material
6-18	Current capacity of the overhead contact line system: AC and DC systems, trains in motion
6-25	Harmonics and Dynamic Effects
6-34.1	Energy - Protective provisions of substations and posts

Package: 46

5-15	ADA Accessibility Requirements for Rolling Stock
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Package: 47

8-18.12	Odometry
8-18.13	Interface to data recording for regulatory purposes
8-18.14	On-Board Pre-Fitting
8-18.15	Driver's External Field of View
8-18.16	Automatic Train Operation and Emergency Brake interfaces
8-18.3	Guaranteed train braking performance and characteristics
8-18.4	Position of TCC antennas
8-18.5	Physical environmental conditions for TCC equipment
8-18.6	Electromagnetic Compatibility between Rolling Stock and TCC On-Board equipment
8-18.7	Isolation of On-Board ATC functionality
8-18.8	Data Interfaces
8-19.1	Interfaces to Subsystem Infrastructure – Train Detection Systems
8-19.2	Wayside TCC Equipment

Package: 48

8-25	Yard Train Control (TC)
8-26	Automatic Train Control (ATC) Centralized Control (ATC-ATS)
8-27	ATC - Operating Modes - Main Line
8-28	Degraded Mode Wayside Signal Control

Package: 54

3-43	Vegetation Control
3-44	Drainage
3-46	Utility Encroachment
3-48	Station Signage and Graphics

Package: 55

3-49	Geotechnical Monitoring – Instrumentation, Record Keeping, and Documentation
3-50.1	Traffic Load on Structures - Seismic Risk and Performance
3-50.2	Traffic Load on Structures - Derailment Effects
3-50.3	Traffic Load on Structures - Temperature Effects
3-50.4	Traffic Load on Structures - Gravity Loads on aerial structures and facilities