Schweizerische Eidgenossenschaft
Confédération suisse
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Confederaziun svizra

Federal Department of the Environment
Transport, Energy and Communications DETEC

**Federal Office of Transport FOT**
Infrastructure Division

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-001** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | June 2015 |
| **Title:** | **Pantograph head width** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC & PAS TSI (1302/2014/EU)<br>Sections 4.2.8.2.9.2/7.3.2.16 |
| **Reference in Swiss regulation:** | RailO Art. 18<br>IP-RailO IP 18 Sheet 16 N |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | The pantograph head width on most lines in Switzerland is restricted to 1450 mm.<br>On some lines, in particular border traffic lines, wider heads up to 1950 mm are possible. Details can be found in the line database or in the infrastructure manager's network statement. |
| **Current applicable norms in Switzerland:** | See national reference/RailO Art. 18 and IP 18 Sheet 16 N. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulations referenced above (esp. SBB R I 50127). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-002** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Narrow switches/Test of passage through switches** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC & PAS TSI (1302/2014/EU)<br>Section 4.2.3.4.1 Safety against derailment running on twisted track |
| **Reference in Swiss regulation:** | RailO Art. 47 para. 1<br>IP-RailO IP 31 para. 2.1<br>SBB R I 50007 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | In comparison with other European countries, the line layout in some station areas in Switzerland is technically difficult to exploit due to the presence of tight deflection curves and short intermediate sections of track with correspondingly small distance between track centres. This places specific requirements on the homologation of new rolling stock that shall be taken account of with special testing. |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2014) apply.<br>Please also refer to regulation SBB R I 50007 and UIC leaflets 505 and 506. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulations referenced above (esp. SBB R I 50007). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-003** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |

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|---|---|---|---|
| **Title:** | **Tight curves r < 250 m** | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | **Address:** | 3003 Bern<br>SWITZERLAND |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | |

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| **Referenced TSI article:** | LOC & PAS TSI (1302/2014/EU)<br>Section 4.2.3.4.2 Running dynamic behaviour |
| **Reference in Swiss regulation:** | RailO Art. 47 para. 1<br>SBB R I 50127 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | The Swiss rail network has a relatively large number of lines with curves (R < 250 m) that do not covered by the prescribed technical assessment.<br>Regulations for assessment area 5 (R < 250 m) referring to EN 14363 in progress (FOT, SBB I, BLS I, SOB I working group). The current status can be found in the interim guideline (SBB R I 50127). |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to regulation SBB R I 50127. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulations referenced above (esp. SBB R I 50127). |

# Notified national technical rules (NNTR)

| ID | CH-TSI LOC&PAS-004 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **Track displacement force** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC & PAS TSI (1302/2014/EU) Section 6.2.3.4 and Appendix J, in which references to EN14363:2005, in which Section 5.3.2.2 para. a) Driving safety limit values |
| **Reference in Swiss regulation:** | RailO Art. 47 para. 1<br>IP-RailO IP 31 para. 2.1<br>SBB R I 50127 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | The maximum permitted sum of guiding forces of rolling stock per wheelset is limited by the permitted track displacement resistance of the infrastructure. Due to the design of the superstructure, in Switzerland a coefficient of α = k1 = 0.85 should be generally used as the control value when calculating the maximum sum of guiding forces. A coefficient of α = k1 = 1.0 can only be applied in exceptional cases and requires special verification.<br>On track tests should be carried out on the basis α = k1 = 0.85. |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to EN 14363:2005 and UIC leaflet 518. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulations referenced above (esp. EN 14363:2005 and UIC leaflet 518). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-005** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Cant deficiency** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |
| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU) corresponding document ERA/TD/2012-17/INT, Version 3.0 Application rules EN14363, Section 4.1 | | | | | | |
| **Reference in Swiss regulation:** | RailO Art. 47 para 1<br>RailO Art. 17<br>IP-RailO IP 17 para. 3.6.2 | | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | | |
| **Full description:** | When speed limits are defined on the Swiss railway network, cant deficiency in the track of 130 mm (freight trains) and 150 mm (passenger trains) is applied without further operating tests. It is therefore essential for rolling stock to be tested for these levels of cant deficiency.<br>Rolling stock not tested for these can't deficiency levels may not be used on the Swiss railway network. | | | | | | |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to EN 14363:2005. | | | | | | |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulations referenced above. | | | | | | |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-006** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |

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| **Title:** | **Authorisation of rolling stock with Series N tilting system** | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | **Address:** | 3003 Bern<br>SWITZERLAND |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU) Section 4.2.3.4.2 |
| **Reference in Swiss regulation:** | RailO Art.17;<br>IP-RailO IP 17 para. 8 (normal gauge) |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | In Switzerland tilting trains run on tracks designed for the R-series. For rolling stock homologation on specific lines it shall be shown that tipping trains can be driven at the envisaged speed. Currently, in Switzerland only trains constructed with an active tilting system to achieve high cant deficiency are regulated by law and permitted under the term 'tilting trains'. Where necessary, other systems can be similarly defined according to the tilting train specifications. |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to regulation SBB R I 20019. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulations referenced above (esp. SBB R I 20019). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-007** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | June 2015 |
| **Title:** | **Flange lubrication** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU)<br>Section 3.3.1 Essential Requirements not covered by TSI |
| **Reference in Swiss regulation:** | RailO Art. 47 para. 1 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | Flange lubrication, requirements for construction of locomotives with flange lubrication system to protect track in tight bends. |
| **Current applicable norms in Switzerland:** | RailO Art. 47 para. 1 is applicable, i.e. rolling stock must be adjusted to the superstructure. RTE 49410 defines the specific construction requirements for locomotives with flange lubrication. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation RTE 49410 referenced above. |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-009** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | June 2015 |

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| **Title:** | **Exhaust emissions from thermal vehicles** | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | **Address:** | 3003 Bern<br>SWITZERLAND |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU)<br>Section 4.2.8.3 |
| **Reference in Swiss regulation:** | RailO Art. 4<br>IP-RailO IP 4 para. 6 Limiting exhaust emission Based on Air Pollution Control Ordinance |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | In Switzerland the requirements for the use of diesel engines (compression-ignition) are stricter than those applicable to locomotives with diesel engines in Europe. These are based on the Air Pollution Control Ordinance and thus on FOEN specifications. |
| **Current applicable norms in Switzerland:** | IP-RailO IP 4 para. 6 FOT Reference to FOEN filter list for compression-ignition engines. |
| **Test specification for certificate of conformity:** | Manufacturer's proof of conformity that the engines meet the current applicable FOEN specifications. |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-010** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | June 2015 |

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|---|---|---|---|
| **Title:** | **Optical warning signal at front of train: 3 x red** | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | **Address:** | 3003 Bern<br>SWITZERLAND |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU)<br>Section 4.2.7.1.2 |
| **Reference in Swiss regulation:** | Swiss Rail Service Regulations (RSR) |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | Vehicles shall be able to display 3 x red at the front of the train in order to warn the oncoming train of danger. Requirement goes beyond TSI requirements. |
| **Current applicable norms in Switzerland:** | RSR R 300.2 para. 8.1.2 |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above. |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-011** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Traction power limitation** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU)<br>Sections 4.2.8.2.3 / 4.2.8.2.4 / 4.2.8.2.7/ 6.2.2.2.13 / 6.2.2.2.14;<br>EN 50388 |
| **Reference in Swiss regulation:** | RailO Art. 44 a<br>IP-RailO IP 44.a para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | 1.) Frequency-dependent traction limitation<br>2.) Voltage-dependent traction limitation |
| **Current applicable norms in Switzerland:** | SBB R I – 50068/50069 |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above (esp. SBB R I – 50068/50069). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-012** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |

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| **Title:** | **Admittance** | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | **Address:** | 3003 Bern<br>SWITZERLAND |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU)<br>Sections 4.2.8.2.3 / 4.2.8.2.4 / 4.2.8.2.7/ 6.2.2.2.13 / 6.2.2.2.14;<br>EN 50388 |
| **Reference in Swiss regulation:** | RailO Art. 47 para. 1;<br>IP-RailO AB 47.1 para. 4;<br>RailO Art. 83g para. 2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | In order to reliably prevent the grid converter of converter-driven vehicles (including corresponding grid converter control system) from inducing grid resonance and so causing instability in the railway power supply grid, the frequency response of the input admittance shall be passive above a cut-off frequency. |
| **Current applicable norms in Switzerland:** | SBB R I – 20005 |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above (esp. SBB R I – 20005). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-013** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Pantograph/Contact line interaction** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU);<br>ENE TSI Sections 4.2.15/4.2.16;<br>EN 50367; EN 50119 |
| **Reference in Swiss regulation:** | RailO Art. 44 c<br>IP-RailO IP 44.c para.3.1 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | Proof that maximum permissible contact pressure is respected and therefore also the maximum permissible contact line uplift under defined operating conditions in single and multiple traction. |
| **Current applicable norms in Switzerland:** | SBB R-I-50088<br>EN 50367 Appendix B Tables B1 and B3 column CH |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above (esp. SBB R-I-50088 and<br>EN 50367 Appendix B Tables B1 and B3 column CH). |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-014** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Compatibility with track-free announcing devices** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |
| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU)<br>Section 4.2.3.3.1.3 | | | | | | |
| **Reference in Swiss regulation:** | RailO Art. 47 para. 1<br>IP-RailO IP 47.1 para. 3.1 | | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | | |
| **Full description:** | Track current interrupted by railway vehicles which lie in the operating frequency range of track circuits. | | | | | | |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>EN 50238-1; CLCMS 50238-2/50238-3; SBB R I-50097 and R I-50098 | | | | | | |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above. | | | | | | |

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-017** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Reference contour (gauge) general** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |
| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU) 4.2.3.1;<br>EN 15273-2 | | | | | | |
| **Reference in Swiss regulation:** | RailO Art.18 and Art. 47<br>IP-RailO IP 18.2/47.2 para. 1 - 14 | | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | | |
| **Full description:** | Justification according to EN 15273 A-derogation (see page 2). | | | | | | |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to EN 15273:2013 (esp. Swiss A-derogation) and UIC leaflets 505 and 506. | | | | | | |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above and the infrastructure manager's specifications. | | | | | | |

*See next on page 15*

Country-specific derogation (A-derogation) in EN 15273

a) In Switzerland structure gauges and their scope of application are set out in the implementing provisions to the Railways Ordinance (IP-RailO, SR 742.141.11/ https://www.admin.ch/ch/d/sr/c742_141_11.html)
   - For reference kinematic profiles in Article 18.2/47.1
   - For infrastructure gauging in Article 18
   - For track gauging in Article 47

In accordance with these provisions, the reference kinematic profiles and the corresponding calculation rules for all types of gauge (e.g. RailO O1, RailO O2, RailO O4) correspond to EN 15273-1:2013. Appendix C, C.1.1 (especially formulae C.1, C.2 and C.3), for all height values *h.*
In Switzerland it is not permitted to apply calculation rules for kinematic gauges for upper levels (h > 3.250 m), in accordance with EN 15273-1:2013, Appendix C, C.1.12.2 and C.2.3 (especially formulae C.9, C.10 and C.11).
The compatibility of the RailO gauges with international gauges in EN 15273-1:2013 is therefore as follows:

- Gauge G1:
  Unrestricted serviceability

- Gauge GA:
  Restricted serviceability within RailO O1 gauge. The formula to be applied to calculate the kinematic track gauge (upper levels) is the same as that of G1, for all height values *h*. The application for heights *h* above 3.250 m, as set out in EN 15273-2 Appendix B, B.3.3.1, B.3.4.1, B.3.5.1 and B.3.6.1, is not permitted in Switzerland. The transport of standard loads for gauge GA is permitted within RailO O1 gauge, in accordance with UIC leaflet 506, Appendix B, Section B.1.1.

- Gauge GB:
  Restricted serviceability within RailO O2 gauge. The formula to be applied to calculate the kinematic track gauge (upper levels) is the same as that of G1, for all height values *h*. The application for heights *h* above 3.250 m, as set out in EN 15273-2 Appendix B, B.3.3.1, B.3.4.1, B.3.5.1 and B.3.6.1, is not permitted in Switzerland. The transport of standard loads for gauge GB is permitted within RailO O2 gauge, in accordance with UIC leaflet 506, Appendix B, Section B.1.1.

- Gauge GC:
  Unrestricted serviceability within RailO O4 gauge.

The infrastructure gauge (upper levels) for all types of gauge (e.g. RailO O1, RailO O2, RailO O4) is calculated in accordance with EN 15273-1:2013, Appendix C, C.2.1, Table C1 (or Appendix C, C.2.3, Table C4) subject to the reference kinematic profiles and the associated calculation rules. The application of the formulae under EN 15273-3:2013 Appendix C, Tables C.2 and C.3 (for heights *h* above 3.250 m) is not permitted in Switzerland.

Justification:

In order to ensure interoperability with regards to the different gauges, the requirements set out in the implementing provisions to the Railways Ordinance (SR 742.141.11/ https://www.admin.ch/ch/d/sr/c742_141_11.html) must also be met in Switzerland.

Switzerland has never accepted the exceptions for height values *h* above 3.250 m (especially for gauges GA and GB) in accordance with UIC leaflet 506, now described in EN 15273-1, EN 15273-2 and EN 15273-3.

# Notified national technical rules (NNTR)

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| **ID** | **CH-TSI LOC&PAS-018** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Minimum curve radius** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU) 4.2.3.6;<br>CR INF TSI (2011/275/EU) |
| **Reference in Swiss regulation:** | RailO Art. 17 and Art. 31<br>SBB I R 50007 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | *The following minimum track requirements shall be met for the free use of train lines in the SBB infrastructure network:*<br>□ *Minimum radius for railcars (and trainsets): Rmin = 125 m*<br>□ *Minimum radius for main-line locomotives: Rmin = 100 m*<br>□ *Minimum radius for passenger carriages: Rmin = 80 m* |
| **Current applicable norms in Switzerland:** | The implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to SBB regulation R I 50007. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above (esp. SBB R I 50007). |

# Notified National Technical Rules (NNTRs)

| ID | CH-TSI LOC&PAS-019 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **The "non leading input signal"** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>Switzerland | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | There are no corresponding interface provisions in TSI LOC&PAS (1302/2014/EU), Section 4.3.4 (Interface with the Control, command and signalling subsystem).<br>TSI CCS, SUBSET-034, Section 2.2.3.3.1 |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1;<br>IP-RailO IP 47.1 para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

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| **Title:** | The "non leading input signal" | | | | |
| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
| | X | - | - | - | - |
| **Scope of application** | All vehicles equipped with ETCS | | | | |
| **Requirement** | 1) The vehicle shall provide the "non leading input signal" to the ETCS on-board unit via the train interface.<br>2) The "non leading input signal" shall only send the value "Non-leading permitted" when the replenishment suppression for the main brake pipe is active.<br>3) The "non leading input signal" shall not depend on the position of the direction selector. | | | | |
| **Reasons/explanation** | Requirement 2) refers to the automatic brake (indirect brake - with a main brake pipe). With the active replenishment suppression it is avoided that the vehicle can delay braking.<br>The requirement in 3) for the "non leading input signal" value to be independent of the position of the direction selector corrects requirement 2.2.3.3.1 b) in Subset-034, Version 3.1.0 to be consistent with operational rules in Switzerland.<br>Requirement relates to CH-TSI CCS-006. | | | | |
| **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | X | X | X | X | |
| **Regulation classification** | Group C | | | | |
| **Validity period** | unlimited | | | | |

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| **Current applicable norms in Switzerland:** | |
| **Test specification for** | |

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| **certificate of conformity:** | |

# Notified National Technical Rules (NNTRs)

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|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-020** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **'Sleeping' input value in case of multiple-unit control** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>Switzerland | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS.<br>Requirement for LOC&PAS, part of ETCS Train Interface Unit specification. |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

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| **Title:** | 'Sleeping' input value in case of multiple-unit control | | | | | |
| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility | |
| | X | X | - | - | X | |
| **Scope of application** | All vehicles equipped with ETCS | | | | | |
| **Requirement** | A vehicle controlled as a multiple unit (additional locomotive) or as a wagon with driving cab shall send the 'Sleeping requested' input value to the ETCS on-board unit via train interface. | | | | | |
| **Reasons/explanation** | An ETCS on-board unit in Sleeping mode processes trackside information. If this vehicle becomes the leading vehicle, it then has the information necessary for the start of mission (e.g. National Values, RBC number, ETCS level, etc.). | | | | | |
| **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | | |
| | X | X | X | X | | |
| **Regulation classification** | Group C | | | | | |
| **Validity period** | unlimited | | | | | |

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| **Current applicable norms in Switzerland:** | |
| **Test specification for certificate of conformity:** | |

# Notified National Technical Rules (NNTRs)

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|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-021** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **One-time train running number entry for the ETCS on-board unit and the GSM-R CabRadio** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | | 3003 Bern<br>Switzerland |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS (1302/2014/EU).<br>Requirement for LOC&PAS. |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

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| **Title:** | One-time train running number entry for the ETCS on-board unit and the GSM-R CabRadio | | | | |
| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
| | X | X | - | - | - |
| **Scope of application** | All vehicles equipped with ETCS | | | | |
| **Requirement** | It shall be technically ensured that the train running number has to be entered only once and that it shall be available to the ETCS on-board unit and to the GSM-R CabRadio (GSM-R voice) so that both use the same train running number.<br>The ETCS on-board unit and the CabRadio shall have the necessary interface and functional features. | | | | |
| **Reasons/explanation** | The train driver can be reached by radio using the train running number (functional addressing). In particular in long tunnels it must be ensured that the driver can be reached immediately (e.g. due to an incident). This can be done if the same train running number is used.<br>Requirement relates to CH-TSI CCS-032. | | | | |
| **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | X | X | X | X | |
| **Regulation classification** | Group C | | | | |
| **Validity period** | unlimited | | | | |

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| **Current applicable norms in Switzerland:** | |
| **Test specification for certificate of conformity:** | |

# Notified National Technical Rules (NNTRs)

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|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-022** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Resetting the emergency brake** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>Switzerland | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | TSI LOC&PAS (1302/2014) 4.2.4.4.1 (4) |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2<br>IP-RailO IP 50.2 para. 2.2.3.3 and 2.2.3.4 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

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|---|---|---|---|---|---|---|
| **Title:** | Resetting the emergency brake | | | | | |
| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility | |
| | X | X | - | - | - | |
| **Scope of application** | All vehicles equipped with ETCS | | | | | |
| **Requirement** | It shall only be possible to reset an emergency brake applied by the ETCS on-board unit in standstill.<br>It shall only be possible to reset the emergency brake by a non-standard multiple manipulation. | | | | | |
| **Reasons/explanation** | In Switzerland, the emergency brake is only applied in safety relevant events. The vehicle must therefore reach standstill as quickly as possible. It must be a conscious action for the driver to reset the brake when the train is at standstill. | | | | | |
| **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | | |
| | X | X | X | X | | |
| **Regulation classification** | Group C | | | | | |
| **Validity period** | unlimited | | | | | |

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| **Current applicable norms in Switzerland:** | |
| **Test specification for certificate of conformity:** | |

# Notified National Technical Rules (NNTRs)

| ID | CH-TSI LOC&PAS-024 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **Provision of two GSM-R data channels** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>Switzerland | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS. |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

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|---|---|---|---|---|---|---|
| **Title:** | Provision of two GSM-R data channels | | | | | |
| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility | |
| | - | X | - | - | - | |
| **Scope of application** | All vehicles equipped with ETCS | | | | | |
| **Requirement** | A vehicle shall make two GSM-R data channels available to the ETCS on-board unit. | | | | | |
| **Reasons/explanation** | For capacity reasons, an ETCS on-board unit needs to be able to establish a data connection with both RBCs during an RBC handover.<br>Requirement relates to CH-TSI CCS-015. | | | | | |
| **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | | |
| | X | X | X | X | | |
| **Regulation classification** | Group C | | | | | |
| **Validity period** | unlimited | | | | | |

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| **Current applicable norms in Switzerland:** | |
| **Test specification for certificate of conformity:** | |

# Notified National Technical Rules (NNTRs)

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|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-025** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Inhibited operability to isolate the ETCS on-board unit** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>Switzerland | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS. | | | | | |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1;<br>IP-RailO IP 47.1 para. 3.2 | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | |
| **Full description:** | **Title:** | Inhibited operability to isolate the ETCS on-board unit | | | | |
| | **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
| | | X | - | - | - | - |
| | **Scope of application** | All vehicles equipped with ETCS | | | | |
| | **Requirement** | The means of isolating the ETCS on-board unit shall be configured in such a way that the unit cannot be isolated unintentionally (e.g. by operating a switch by mistake). | | | | |
| | **Reasons/explanation** | Isolating the ETCS on-board unit poses a considerable hazard. Isolation results in the train no longer being supervised by the ETCS on-board unit or rather its brake interventions are non-effective. | | | | |
| | **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | | X | X | X | X | |
| | **Regulation classification** | Group C | | | | |
| | **Validity period** | unlimited | | | | |
| **Current applicable norms in Switzerland:** | | | | | | |
| **Test specification for certificate of conformity:** | | | | | | |

# Notified National Technical Rules (NNTRs)

| ID | CH-TSI LOC&PAS-026 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **SIGNUM/ZUB not permitted on vehicles with ERTMS/ETCS Baseline 3** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | 3003 Bern<br>Switzerland | | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS. | | | | | |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2 | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | |
| **Full description:** | **Title:** | SIGNUM/ZUB not permitted on vehicles with ERTMS/ETCS Baseline 3 | | | | |
| | **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
| | | X | - | - | - | - |
| | **Scope of application** | All vehicles equipped with ETCS | | | | |
| | **Requirement** | Vehicles equipped with an ETCS on-board unit with Baseline 3 shall not support a train control system specific to Switzerland (ETM, ZUB, SIGNUM). | | | | |
| | **Reasons/explanation** | Vehicles equipped with an ETCS on-board unit with Baseline 3 run in Switzerland with ETCS. Trackside is not equipped to allow such trains to switch to train control systems specific to Switzerland. | | | | |
| | **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | | - | - | X | X | |
| | **Regulation classification** | Group C | | | | |
| | **Validity period** | unlimited | | | | |
| **Current applicable norms in Switzerland:** | | | | | | |
| **Test specification for certificate of conformity:** | | | | | | |

# Notified National Technical Rules (NNTRs)

| ID | CH-TSI LOC&PAS-027 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **Manual radio remote control in Shunting mode** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | 3003 Bern<br>Switzerland | | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS. |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3, para. 1.1<br>IP-RailO IP 47.1, para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

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|---|---|---|---|---|---|---|
| **Title:** | Manual radio remote control in Shunting mode | | | | | |
| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility | |
| | X | - | - | - | - | |
| **Scope of application** | All vehicles equipped with ETCS | | | | | |
| **Requirement** | If a vehicle is equipped with radio remote control that permits external manual operation of the vehicle, the following requirements apply:<br>1. It shall only be possible to activate the radio remote control when the ETCS on-board unit is in Shunting mode (SH).<br>2. If the ETCS on-board unit leaves Shunting mode (SH) whilst the radio remote control is active, the vehicle shall be brought to an immediate standstill by technical means. | | | | | |
| **Reasons/explanation** | A range of risks relating to shunting movements on ETCS L2 lines can only be mitigated by requiring the ETCS on-board unit to be in Shunting mode (SH). | | | | | |
| **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | | |
| | X | X | X | X | | |
| **Regulation classification** | Group C | | | | | |
| **Validity period** | unlimited | | | | | |

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| **Current applicable norms in Switzerland:** | |
| **Test specification for certificate of conformity:** | |

# Notified national technical rules (NNTR)

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|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-028** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |

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|---|---|---|---|
| **Title:** | **Gauge, doors** | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | **Address:** | 3003 Bern<br>SWITZERLAND |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU) 4.2.3.1;<br>EN 15273-2 |
| **Reference in Swiss regulation:** | RailO Art.18 and Art. 47<br>IP-RailO IP 18.2/47.2 para. 1 - 14 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | Justification according to EN 15273 A-derogation (see page 2). However, entrance doors that utilise the conditions in UIC leaflet 560, sections 1.1.4 to 1.1.4.3 are permitted. |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to EN 15273:2013 (esp. Swiss A-derogation) and UIC leaflets 505 and 506 and esp. 560. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above and the infrastructure manager's specifications. |

# Notified national technical rules (NNTR)

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|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-029** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Safety against derailment Y/Q** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |
| **Referenced TSI article:** | TSI LOC&PAS (1302/2014/EU) Appendix J.2;<br>ERA/TD2012-17 INT rev 3.0, clause 4.3.10 | | | | | | |
| **Reference in Swiss regulation:** | RailO Art. 47<br>IP-RailO IP 47 para. 1 | | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | | |
| **Full description:** | The alternative verification procedure on respect of coefficient Y/Q in accordance with clause 4.3.10, ERA/TD2012-17 INT rev 3.0 may not be applied in Switzerland for vehicles which are the subject of this TSI. | | | | | | |
| **Current applicable norms in Switzerland:** | EN 14363:2005. | | | | | | |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above and the infrastructure manager's specifications. | | | | | | |

# Notified national technical rules (NNTR)

| ID | CH-TSI LOC&PAS-030 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **Use of braking systems without friction** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | | 3003 Bern<br>SWITZERLAND | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | LOC&PAS TSI (1302/2014/EU) Section 4.2.4.8.3. Eddy current track brake<br>Section 4.2.7.2.2 |
| **Reference in Swiss regulation:** | IP- RailO IP 31 para. 2.1<br>RailO Art. 47 para. 1<br>R RTE 220.41 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☒ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☐ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |
| **Full description:** | The use of braking systems independent of wheel-rail adhesion conditions (e.g. eddy current track brakes, magnetic track brakes) for service braking is not permissible in Switzerland. The superstructural constructions used in Switzerland and calculated according to IP-RailO on Art. 31, para. 2.1 are not designed for the additional forces and temperatures generated by these braking systems.<br>The weldability limits of long welded rails set according to the stability calculation (IP-RailO on Art. 31, para. 5) (set for Switzerland in R RTE 200.41) do not take account of the additional forces and temperatures generated by these braking systems.<br>Magnetic brakes for emergency braking as required by INF TSI are permitted. |
| **Current applicable norms in Switzerland:** | The norms set out in the implementing provisions of the Railway Ordinance (version 01.07.2016) apply.<br>Please also refer to R RTE 220.41. |
| **Test specification for certificate of conformity:** | The conformity assessment is based on the requirements and norms in the sections in the Swiss regulation referenced above. |

# Notified National Technical Rules (NNTRs)

| ID | CH-TSI LOC&PAS-031 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| Title: | Safe traction cut-off | | | | | | |
| Office responsible: | Federal Office of Transport FOT<br>Approvals and Rules Section | | | Address: | | 3003 Bern<br>Switzerland | |
| E-mail: | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS for multi-unit traction vehicles, double-headed trains or traction vehicles at the rear of the train. | | | | | |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2<br>IP-RailO IP 50.1 para. 13.2 | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | |
| **Full description:** | **Title:** | Safe traction cut-off | | | | |
| | **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
| | | X | - | - | - | - |
| | **Applicability** | All vehicles equipped with ETCS | | | | |
| | **Requirement** | It shall be ensured that when the emergency brake is activated by the ETCS on-board unit on the leading vehicle, traction is also cut-off on the non-leading vehicles.<br>The tolerated unavailability for traction cut-off on the leading vehicle and for multi-unit traction vehicles is set at $1*10^{-7}$.<br>On manned non-leading traction vehicles (ETCS on-board unit in Non Leading mode) it shall be ensured by technical means that the traction is cut off if the leading vehicle reduces the pressure in the main brake pipe. The tolerated unavailability is set at $1*10^{-5}$.<br>Traction cut-off comprises the whole chain, from the ETCS on-board unit to the unit which performs the traction cut-off on the vehicle. | | | | |
| | **Reasons/explanation** | In the case of the emergency brake has been activated, safe traction cut-off must also be ensured when trains are running as multi-unit traction vehicles or a traction vehicle is at the rear of the train as a booster-locomotive. or a so called Q-locomotive.<br>Traction is normally cut-off 'safely' via two channels, whereby one channel takes effect via pressure reduction in the main pipe. The multi-unit control or the train driver (in the case of a booster locomotive, Q-locomotive or double-headed train) may act as the second channel.<br>A deviation from this two-channel system is only permitted if it can be shown that other measures with an equivalent degree of safety are in place and therefore that the train will stop safely before the point of danger.<br>The vehicle integrator and the vehicle keeper are responsible for demonstrating in the "SiNa VI" and "SiNa II" that the requirement is met or that equivalent measures are in place. For this purpose, the | | | | |

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|---|---|---|---|---|---|---|
| | | corresponding regulations must exist, and these must be bindingly applied even if the vehicle keeper is not the vehicle operator. | | | | |
| | **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | | X | X | X | X | |
| | **Regulation classification** | Group C | | | | |
| | **Validity period** | unlimited | | | | |
| **Current applicable norms in Switzerland:** | | | | | | |
| **Test specification for certificate of conformity:** | | | | | | |

# Notified National Technical Rules (NNTRs)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **ID** | **CH-TSI LOC&PAS-034** | **State:** | Switzerland | **Status** | **Applicable** | **from:** | July 2016 |
| **Title:** | **Automatic transmission of train data on train sets** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | | **Address:** | 3003 Bern<br>Switzerland | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

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|---|---|---|---|---|---|---|
| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS. Requirement for LOC&PAS, information for the ETCS on-board unit. | | | | | |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2 | | | | | |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI | | | | | |
| **Full description:** | **Title:** | Automatic transmission of train data on train sets | | | | |
| | **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
| | | X | - | - | - | - |
| | **Scope of application** | All train sets equipped with ETCS | | | | |
| | **Requirement** | New train sets shall automatically determine the required train data (SRS, Section 3.18.3) and transmit it via train interface to the ETCS on-board unit. | | | | |
| | **Reasons/explanation** | When train data are automatically determined and transmitted to the ETCS on-board unit, this reduces the risk of the train data being entered incorrectly by the train driver.<br>Train sets retrofitted with an ETCS on-board unit should automatically determine the required train data (SRS, Section 3.18.3) and transmit it via train interface to the ETCS on-board unit.<br>Requirement relates to CH-TSI CCS-019. | | | | |
| | **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | | X | X | X | X | |
| | **Regulation classification** | Group C | | | | |
| | **Validity period** | unlimited | | | | |
| **Current applicable norms in Switzerland:** | | | | | | |
| **Test specification for certificate of conformity:** | | | | | | |

# Notified National Technical Rules (NNTRs)

| ID | CH-TSI LOC&PAS-035 | State: | Switzerland | Status | Applicable | from: | July 2016 |
|---|---|---|---|---|---|---|---|
| **Title:** | **Sufficient braking performance during emergency braking** | | | | | | |
| **Office responsible:** | Federal Office of Transport FOT<br>Approvals and Rules Section | | | **Address:** | 3003 Bern<br>Switzerland | | |
| **E-mail:** | _BAV-WeiterentwicklungRegelwerke@bav.admin.ch | | | | | | |

| | |
|---|---|
| **Referenced TSI article:** | No corresponding requirements in TSI LOC&PAS |
| **Reference in Swiss regulation:** | IP-RailO IP 38.3 para. 1.1<br>IP-RailO IP 47.1 para. 3.2 |
| **Current NNTR classification:** | ☐ NNTR on an 'open point' in the TSI<br>☐ NNTR due to difference between Swiss regulation and corresponding requirements in the TSI<br>☒ NNTR due to additional requirements in Swiss regulation without equivalent in the TSI |

**Full description:**

| | |
|---|---|
| **Title:** | Sufficient braking performance during emergency braking |

| **Type of Requirement** | Safety | Reliability / availability | Health | Environment | Technical compatibility |
|---|---|---|---|---|---|
| | X | - | - | - | - |

| | |
|---|---|
| **Scope of application** | All vehicles equipped with ETCS |
| **Requirement** | It shall be ensured that the effective braking means during emergency braking can achieve at least the same braking performance as the safe braking means that have been considered in the calculation of ETCS braking curves.<br><br>In particular, the following scenario shall be taken into account for trains whose number of powered axles is greater than 20 % of the number of all axles, and for all trains with a maximum speed > 160 km/h:<br><br>If the regenerative brake is used during emergency braking from a high speed, it shall be demonstrated by how much the braking distance increases if the catenary voltage fails. This increase in braking distance shall be taken into account when braking performance is calculated.<br><br>The braking effect of the emergency braking activated by the train control system in the leading traction vehicle shall not be reduced by either the leading vehicle or by other vehicles in the train (e.g. due to replenishment of the main brake pipe). This requirement applies independently of the ETCS mode of the non-leading vehicles.<br><br>The emergency brake application shall meet the following value:<br><br>Tolerated unavailability: $1*10^{-7}$<br><br>The emergency brake application comprises the entire pathway from the output by the ETCS on-board unit to the lowering of the air pressure in the main brake pipe on the vehicle equipped with the ETCS on-board unit. |
| **Reasons/explanation** | If the braking distance is increased in case of an emergency brake, this may lead to a hazardous situation.<br><br>Requirement relates to CH-TSI CCS-007. |

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|---|---|---|---|---|---|---|
| | **Applies to** | 2.2.2 + | 2.3.0d | 3.4.0 | 3.6.0 | |
| | | X | X | X | X | |
| | **Regulation classification** | Group C | | | | |
| | **Validity period** | unlimited | | | | |
| **Current applicable norms in Switzerland:** | | | | | | |
| **Test specification for certificate of conformity:** | | | | | | |