

# DIN EN 15746-1:2010-09 (E)

## Railway applications - Track - Road-rail machines and associated equipment - Part 1: Technical requirements for running and working

---

Contents	Page
Foreword .....	5
Introduction .....	6
1 Scope .....	7
1.1 General .....	7
1.2 Validity of this European Standard .....	8
2 Normative references .....	8
3 Terms and definitions .....	9
4 Machine categorisation .....	13
4.1 Categories .....	13
4.1.1 General .....	13
4.1.2 Example of Category 8 machine .....	13
4.1.3 Examples of Category 9 A machines .....	14
4.1.4 Examples of Category 9 B machines .....	15
4.1.5 Examples of Category 9 C machines .....	16
4.2 Type approval and categories .....	17
4.3 Type qualification for being in a train .....	17
5 Railway specific safety requirements and/or measures .....	17
5.1 General .....	17
5.2 Gauge .....	17
5.2.1 Running gauge .....	17
5.2.2 Road-rail machine in running configuration .....	18
5.2.3 Working limit .....	19
5.2.4 Determination of lateral limit of exceedance allowed on curves in working configuration .....	20
5.2.5 Limits in lower area in working and running configuration .....	20
5.2.6 Working limit in the upper area .....	21
5.3 Requirement for clearance of track obstacles .....	22
5.4 Interaction with the infrastructure .....	22
5.4.1 General .....	22
5.4.2 Main wheels .....	22
5.4.3 Auxiliary wheels, auxiliary guides and working parts .....	23
5.4.4 Loads applied to the ballast .....	23
5.4.5 Loads applied to the formation .....	23
5.4.6 Forces on structures as a function of axle load configurations .....	24
5.5 Running safety equipment .....	24
5.6 Running safety and prevention of derailment .....	24
5.6.1 General .....	24
5.6.2 Running safety for Category 8 machines and Category 9 machines with an admissible speed of 60 km/h < v 100 km/h .....	24
5.6.3 Running safety for Category 9 machines with an admissible speed v 60 km/h .....	25
5.6.4 Track test for all machines .....	26
5.6.5 Lifeguards .....	26
5.7 Stability and prevention of overturning .....	26
5.8 Machine frame and structure .....	26
5.8.1 Design of the machine frame .....	26
5.8.2 Lifting and jacking points .....	27

5.9	Inter machine couplings .....	27
5.9.1	General .....	27
5.9.2	Category 8 machines buffering and drawgear .....	28
5.10	Running gear .....	28
5.10.1	General .....	28
5.10.2	Distribution of the wheelset forces in running configuration .....	28
5.10.3	Machine rail wheel base .....	29
5.10.4	Rail wheel, wheel profile .....	29
5.10.5	Rail wheel arrangements .....	31
5.10.6	Load on rail wheels .....	31
5.10.7	Load on rail wheels in working condition .....	32
5.10.8	Operation of spring loaded points .....	34
5.10.9	Ratio of wheel load on guiding wheels to road axle load .....	34
5.11	Rail wheel suspension .....	35
5.11.1	Rail wheel suspension systems .....	35
5.11.2	Positively locked suspension .....	36
5.11.3	Active suspension .....	36
5.11.4	All suspension systems .....	36
5.12	Braking .....	36
5.12.1	General braking requirements .....	36
5.12.2	Specific requirements for Category 9 machines with continuous air brake system .....	36
5.13	Driving and working cabs and places .....	38
5.14	Controls .....	38
5.15	Visibility and audibility of the machine .....	38
5.15.1	Lighting in running configuration - marker lights .....	38
5.15.2	Lighting with failed engine .....	39
5.15.3	Lamp brackets .....	39
5.15.4	Light switching arrangements .....	41
5.15.5	Additional lighting requirements for Category 8 machines .....	41
5.15.6	Head lights .....	42
5.15.7	Lighting in working configuration .....	42
5.15.8	Horns in running configuration .....	42
5.15.9	Colour of the machine .....	42
5.16	Warning systems for personnel of traffic on adjacent lines in working configuration .....	43
5.16.1	General .....	43
5.16.2	Acoustic warning systems .....	43
5.16.3	Optical warning devices .....	43
5.16.4	Platform to set up a warning unit .....	43
5.17	Electrical equipment and earth bonding .....	44
5.17.1	Equipotential bonding .....	44
5.17.2	Antennae .....	44
5.17.3	Pantograph .....	44
5.18	Electromagnetic compatibility .....	44
5.18.1	Emissions from machines .....	44
5.18.2	Immunity of machines from railway environment .....	45
5.19	Operation of track equipment by Category 8 machines .....	45
5.19.1	Operation of track circuits .....	45
5.19.2	Operation of axle-counters and treadles .....	45
5.19.3	Operation of treadles associated with level crossings .....	45
5.19.4	Operation of hot axlebox and unreleased brake detectors .....	45
5.20	Power supply .....	46
5.21	Failure recovery conditions .....	46
5.21.1	Towing devices .....	46
5.21.2	Emergency device .....	46
5.22	On and off tracking .....	46
5.22.1	General .....	46
5.22.2	Use of turntables .....	46
5.23	Setting up and packing away .....	47
5.23.1	General .....	47
5.23.2	Emergency recovery of equipment .....	47
5.24	Mobile elevating work platform (MEWP) and excavators/loaders used as MEWPs .....	47
5.25	General and railway specific attachments .....	47

<b>5.25.1</b>	<b>General .....</b>	<b>47</b>
<b>5.25.2</b>	<b>General attachments for raising and lowering personnel .....</b>	<b>47</b>
<b>5.25.3</b>	<b>Railway specific attachments with rail guidance wheels .....</b>	<b>47</b>
<b>5.26</b>	<b>Exhaust .....</b>	<b>47</b>
<b>6</b>	<b>Marking and numbering of the machines .....</b>	<b>48</b>
<b>6.1</b>	<b>Warning signs and pictograms .....</b>	<b>48</b>
<b>6.2</b>	<b>Machine identification number .....</b>	<b>48</b>
<b>6.3</b>	<b>Details of the railway infrastructure where the machine is allowed to work .....</b>	<b>48</b>
<b>7</b>	<b>User information .....</b>	<b>48</b>
<b>8</b>	<b>Verification of the conformity to the requirements and/or particular safety measures .....</b>	<b>50</b>
<b>Annex A (informative)</b>	<b>Special national conditions .....</b>	<b>52</b>
<b>Annex B (normative)</b>	<b>Application of technical requirements to machine categories - Category of machine .....</b>	<b>59</b>
<b>Annex C (normative)</b>	<b>Check list for conformity .....</b>	<b>63</b>
<b>Annex D (normative)</b>	<b>Certificates .....</b>	<b>68</b>
<b>D.2.1</b>	<b>Machine identification .....</b>	<b>69</b>
<b>D.2.2</b>	<b>General characteristics .....</b>	<b>70</b>
<b>Annex E (normative)</b>	<b>Machine numbering structure for Category 9 machines not designed to operate track signalling and control systems .....</b>	<b>71</b>
<b>E.1</b>	<b>General .....</b>	<b>71</b>
<b>E.2</b>	<b>Examples .....</b>	<b>73</b>
<b>Annex F (normative)</b>	<b>Machine identification plate for Category 9 machines not designed to operate track signalling and control systems .....</b>	<b>74</b>
<b>Annex G (informative)</b>	<b>Structure of European Standards for track construction and maintenance machines .....</b>	<b>75</b>
<b>Annex ZA (informative)</b>	<b>Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC .....</b>	<b>76</b>
<b>Bibliography</b>	<b>.....</b>	<b>77</b>