

Air Quality and Lighting Environment for Traincrew Inside Railway Vehicles

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Synopsis

This Standard prescribes requirements for air quality and lighting levels in traincrew areas inside railway vehicles, to ensure an acceptable working environment in which drivers and other traincrew can carry out their operational duties safely and effectively. The standard applies to traction and rolling stock vehicles and to on-track machines.

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Part A

Issue record

This Railway Group Standard will be updated when necessary by distribution of a complete replacement.

Amended or additional parts of revised pages will be marked by a vertical black line in the adjacent margin.

Issue	Date	Comments
I	Dec 95	Original Document Supersedes GM/TT0100

Responsibilities and distribution

Controlled copies of this standard shall be complied with by all persons who are responsible for specifying requirements for interior environments of railway vehicles, including Traction and Rolling Stock (T&RS) and On-Track Machines.

The standard shall be distributed to:

- engineers and managers with responsibilities for railway vehicles in the fields of technical and operating specification, design, development, procurement, testing, maintenance and Engineering Change;
- all train operators and contractors having T&RS or on-track machines for operation on Railtrack lines.

Implementation

The provisions of this standard are mandatory. The standard shall apply from 6 April 1996 to all new procurement contracts placed for new vehicles. The standard shall also apply from the same date to existing vehicles when they are subject to Engineering Change, insofar as it is reasonably practicable.

Health and Safety Responsibilities

In authorising this standard, Railtrack PLC makes no warranties, express or implied, that compliance with all or any Railway Group Standards is sufficient on its own to ensure safe systems of work or operation. Each user is reminded of its own responsibilities to ensure health and safety at work and its individual duties under health and safety legislation.

Supply

Controlled and uncontrolled copies of this standard must be obtained from The Catalogue Secretary, Safety & Standards Directorate, Railtrack PLC, Floor 2, Fitzroy House, 355 Euston Road, London, NW1 3AG.

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Part B

1 Purpose This standard prescribes the requirements for ventilation air and normal and emergency lighting levels in Traincrew areas of railway vehicles, to ensure a working environment in which drivers and other traincrew can carry out their operational duties safely and effectively and maintain safety on Railtrack lines.

2 Scope The requirements of this standard apply to railway vehicles that operate on Railtrack lines and which carry traincrew undertaking their operational duties. The requirements apply to Traction and Rolling Stock (T&RS) vehicles and to On-Track Machines.

The requirements apply to new vehicles. The requirements also apply to existing vehicles when undergoing Engineering Change, insofar as it is reasonably practicable to incorporate them.

Deviations from the specific requirements of this standard are permissible for vehicles that operate in international traffic, providing that it is demonstrated that an equivalent or higher level of safety is achieved.

3 Definitions For the purposes of this Standard, the following definitions apply.

Engineering Change

Any alteration or modification to the design of a vehicle that carries Traincrew and which affects the environmental performance of that vehicle, in terms of air quality and lighting environment.

Escape Route

A route which provides a means of escape from a point in a vehicle to a final exit from the train.

Illuminance

The lighting level per unit surface area expressed in Lux, where
 $1 \text{ Lux} = 1 \text{ Lumen/m}^2$.

On-Track Machine

A rail-mounted machine that meets the requirements of GM/RT2400 (reference [1]).

Traincrew

Staff and personnel such as drivers, guards and conductors employed on board a train who have responsibilities for its safe operation on Railtrack lines, as defined in the Rule Book GO/RT3000.

Uniformity of Illuminance

The ratio of the minimum Illuminance to the average Illuminance.

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4 General Requirements

4.1 Vehicles that carry Traincrew and operate on Railtrack lines shall be designed and maintained so that they provide a safe and effective working environment which promotes alertness in drivers and other traincrew, to enable them to carry out their operational duties safely and effectively.

4.2 Traincrew areas shall meet the requirements of this standard over the full range of variations in vehicle conditions that are likely to be experienced. Account shall be taken of:

- (a) the influences of normal variations in maintenance condition and of vehicle failure modes;
- (b) the likely routes and areas of operation and the extent and effects of operation in tunnels;
- (c) the range of ambient weather, temperature and humidity conditions; daytime and night-time conditions; and any other relevant variables.

4.3 Traincrew areas shall be maintained so that prescribed tolerances for components, assemblies and systems that influence the mandatory requirements for ventilation air and for lighting levels are sustained over the lives of the vehicles.

5 Air Quality

5.1 Train areas dedicated to traincrew shall be adequately ventilated to ensure that carbon dioxide levels remain at an acceptable level under normal operation. For driving cabs this requires a minimum of 60 cubic metres of fresh air per hour per person. For other traincrew areas, a minimum of 20 cubic metres of fresh air per hour per person is required.

5.2 All traincrew areas shall be ventilated such that carbon monoxide levels are kept as near as practicable to the normal outdoor ambient levels and shall not exceed 0.01% (100 ppm). This requires minimal ingestion of fumes and smoke generated by the train into the areas where traincrew carry out their duties.

5.3 Any ventilation air streams that can be directed on to the faces of traincrew should be filtered to ensure that particulate matter is prevented from causing irritation.

5.4 A means of emergency ventilation shall be available to traincrew.

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6 Lighting

6.1 Adequate lighting shall be provided in all areas and passageways used by traincrew so that they can carry out their operational duties safely, under both normal and emergency conditions. Lighting levels in traincrew areas shall be sufficient to allow effective control of train safety and emergency systems and equipment, and enable associated signs and notices to be read, in accordance with references [2] and [3]. Lighting levels in traincrew areas shall also be sufficient to permit safe access to and egress from vehicles in accordance with reference [4]. Lighting of drivers' controls and instruments shall be in accordance with reference [5].

6.2 Normal Lighting

6.2.1 The minimum illuminance for vehicles in service operation shall be 20 Lux, with a minimum Uniformity of Illuminance of 0.67. This shall be measured at floor level and shall exclude the effect of light entering a vehicle from outside. Areas to be lit shall include aisles, doorways, vestibules, egress points, interconnecting gangways, corridors and toilets.

6.2.2 The vehicle lighting system shall be arranged to ensure that the lighting level quoted in Clause 6.2.1 is reliably available.

6.3 Emergency Lighting

6.3.1 The minimum illuminance at vehicle egress points in an emergency situation shall be 20 Lux at floor level.

6.3.2 The minimum illuminance on escape routes other than those specified in Clause 6.3.1 shall be 5 Lux at floor level.

6.3.3 The minimum illuminance on emergency equipment provided to assist in egress from a vehicle shall be 20 Lux.

6.3.4 The emergency lighting levels specified above shall be available for at least 1½ hours after failure of the vehicle's primary power source.

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References

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|-----|-----------|---|
| [1] | GM/RT2400 | Design of On-Track Machines |
| [2] | GM/RT2185 | Train Safety Systems |
| [3] | GM/RT2177 | Emergency and Safety Equipment and Signs on Rail Vehicles |
| [4] | GM/RT2162 | Traincrew Access to and Egress from Railway Vehicles |
| [5] | GM/RT2161 | Requirements for Driving Cabs of Railway Vehicles |

Related Documents (for Information only)

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| GM/RT2160 | Ride Vibration and Noise Environment Inside Railway Vehicles |
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