

1. SCOPE OF APPLICATION

1.1. - These regulations apply to locomotives, railcars and multiple unit trains, and also to driving trailers powered by different forms of traction, except steam traction.

Apart from the features specific to them (see UIC Leaflet 646), these regulations apply also basically to shunting engines.

1.2. - These regulations are :

- of an *obligatory* nature for all new stock likely to be used on international services referred to in 1.1. ;

- of a *recommendatory* nature for all other stock.

2. NUMBER AND ARRANGEMENT

OF SEATS FOR STAFF

2.1. - Drivers' compartments must be arranged so that the units may be driven by one man.

2.2. - Driver's seat

2.2.1. - In the case of locomotives, railcars and units forming multiple unit trains which are provided with a driver's compartment, the position of the driver's seat must be such that he can be seated facing the track when driving. In addition, the driver must be seated on one side of the compartment so that, without leaving the driving controls he can keep the train under observation from the side which he occupies, and communicate with the staff at stations.

2.2.2. - In the case of locomotives, it must also be possible for the vehicle to be driven from a standing position in accordance with the conditions contained in 2.2.1. above.

2.3. A seat facing the track must also be provided for a second man (pilot-man, guard, or other person).

3. DIMENSIONS AND LAY-OUT OF THE DRIVER'S COMPARTMENT

3.1. - Adequate space must be provided in the compartments, every point of which must be accessible from a standing position. They must be at least 2000 mm in height, and, measured at the eye level of the driver when seated, there must be a minimum of 1200 mm between the inner side of the front window and the nearest object situated behind the driver's seat : partition, door, chest, etc.

Wherever possible, however, this distance shall not be less than 1500 mm over a width of 2000 mm at least (see Appendix 1).

The distance from the driver's eyes to the window situated in front of his seat must be between 500 and 1200 mm (see Appendix 1).

The width of the drivers' compartments must be such that the crews can keep the moving train under observation from each side through the side windows, without having to lean out in a dangerous manner or make use of mirrors.

The volume of air actually available in the drivers' compartments must be as near to 10 m³ as possible ; this value can be lower if ventilation or air-conditioning in the compartment is adequate.

3.2. - The freedom of movement of the crews within the drivers' compartments must not be hampered by awkward projections.

The driver and second man (when present) must feel comfortable in the sitting position and their mobility must not be impaired. To this end, the dimensions of an ordinary seat and the number of persons allowed in the compartment must be taken into consideration (see Appendix 1).

3.3. - Drivers' compartments must be fully enclosed on all sides. The doors, windows, pipe runs through partitions, floors, and devices for closing ventilation and assembly apertures, must be absolutely tight-fitting, draught-proof and designed to keep out exhaust gases.

The compartments must be equipped with apparatus enabling them to be heated and ventilated adequately by a process of slightly increasing pressure. There must also be a temperature control device, the setting device of which can be installed wherever convenient.

However, when the temperature is controlled automatically, it must be set so as not to exceed 23°C.

The heat insulation of the compartment must be adequate, particularly as regards the floor and roof.

3.3.1. - The compartment ventilation system must be designed to ensure adequate renewal of the air (which can be adjusted by the driver) without causing any unpleasant draught, (recommended fresh-air intake : 30 m³ per hour and per person, adjustable between 0.1 and 0.5 m³/sec at the level of the drivers' head).

3.3.2. - It is recommended that this system should also enable the driver to evacuate heat accumulation rapidly.

3.3.3. - The following temperatures are recommended :

- minimum compartment temperature when the outside temperature is low : between 18° and 20° C ;
- the maximum compartment temperature when the outside temperature is high must be the lowest that can be achieved by adequate ventilation.

In particularly warm regions where the ambient temperature often exceeds 30° C, it is also recommended that drivers' compartments should be provided with air-cooling devices fulfilling the conditions generally applicable to air-conditioning systems (see also UIC Leaflet 553):

$$t_{int} = 20 + 0,5 (t_{ext} - 20) \text{ in } ^\circ\text{C}$$

3.3.4. - Exhaust devices in thermal traction engines must be designed to ensure that exhaust gas is not recycled through the ventilation circuit.

3.3.5. - When high speeds are involved, particularly of over 200 km/h, the driving crews must be protected against sudden air-pressure fluctuations that might occur when meeting other trains and/or entering tunnels.

3.4 - Drivers' compartments have always been designed taking account of technological progress in order to achieve optimum working conditions ; it is logical, on this basis, that the specifications for equipment to be built should be improved and the following values thus adopted.

3.4.1. - Noise level in the drivers' compartments, as measured according to criteria now applicable, must be kept as low as possible, by limiting noise at source and using acoustic-insulation and sound-absorption devices.

3.4.2. - The equivalent noise level must not exceed 80 dB(A) in the drivers' compartments of tractive units running at speeds of ≤ 140 km/h.

3.4.3. - When higher speeds are involved, every effort must be made to ensure that the equivalent noise level does not exceed 80-82 dB(A).

3.4.4. - The definition of the notion of equivalent noise level is provided by ISO standard R1999.

3.5. - The colours of the walls, roofs, floors, control desks, cupboards, fittings, etc. must be harmonious and not cause eye strain. When choosing paints and surface coatings, it must be ensured that they are not of the type that can inconvenience the driver through reflected light.

4 - DOORS

4.1. - There must be at least one door giving direct access to the outside on each side of the driver's compartment. The door between the driver's compartment and the adjacent compartment can, however, be dispensed with:

- if on one or both sides, the driver's compartment connects with a compartment which has a door on one or both sides for direct access to the outside and which is located near the driver's compartment, it shall not be compulsory to have a door giving direct access to the outside in the driver's compartment itself on the side on which there already is a door in the adjacent compartment ;

- on one of the sides, if the door on the other side is positioned less than 8 metres from the front of the buffers situated in front of the driver during running.

4.2. - The compartments must comply with the conditions of UIC leaflet 617-5 as regards the door or doors communicating with the adjacent compartment.

4.3. - The doors of the drivers' compartments must measure as far as possible : height - 1750 mm ; width - 600 mm and give a minimum clearance of 1675 x 500 mm. The doors of driving compartments with a floor level access must give a minimum clearance of 1750x500 mm.

5 - DESKS (see Appendix 2)

5.1. - The desks must be designed to take account of the anthropometric measurements of the driving crews, and of the tasks to be carried out (operation of equipment and monitoring).

5.1.1. - The desk and driving equipment must be arranged in such a manner that they do not hinder the driver when in his normal position, or hamper his freedom of movement.

5.2. - The desk must be arranged in such a manner that the driver can reach his seat easily, and move his legs and knees freely ; it must also enable driving in the standing position whenever provision is made for this (see also Article 2.2.2.).

5.2.1. - The vertical distance from the front edge of the footrest(s) to the underside of the desk must be a minimum of 630 mm. The horizontal distance from the desk edge to the front edge of the footrest(s) must be approximately 170 mm.

5.2.2. - The vertical distance from the front edge of the footrest(s) to the upper front edge of the desk shall be a maximum of 800 mm.

5.2.3. - The space under the desk must be at least 600 mm in depth, measured from the front edge of the desk.

5.3. It is recommended that :

- all the driving equipment, and
 - all the information equipment
- should be grouped together on the desk.

5.3.1. - The surface of desks incorporating frequently-used driving equipment, must be set at an angle of up to 20° from the horizontal.

5.3.2. - The surface of desks incorporating frequently-observed control equipment must be set at an angle of between 20 and 40° from the vertical.

6 - SEATS (See Appendix 2)

6.1. - The seats must be designed so that adequate stability is ensured. It is recommended that they should be secured to the floor, in which case they should be adjustable in the longitudinal direction and fold up if required. They must also allow for driving in the standing position, when this is provided for.

6.1.1. - They must enable the driver to leave the compartment quickly when necessary (see also Appendix 1).

6.2. - The seats must provide a comfortable sitting position for the driver.

6.2.1. - It is recommended that the seats should be designed to allow for differences in height of train crews.

6.2.2. - The adjustable height of the seats must be 70 mm at the minimum. Their minimum height when the driver is seated, as measured from the seat pan to the front edge of the footrest(s), must be a minimum of 400 mm.

6.2.3. - The seat pan must be between 400 and 500 mm in depth.

6.2.4. - It must be between 410 and 480 mm in width.

6.2.5. - The seat pan must be inclined backwards at an angle of about 5°; it must be curved in shape and have a waterfall leading edge.

6.2.6. - When swivelling seats are fitted, it must be possible for them to be secured in the working position, but not locked.

6.2.7. - The seat pan must be covered with porous material which allows the body to perspire normally.

6.2.8. - The seats must have a built-in vibration dampening mechanism, easily adjustable to body weight if possible, to the extent that the riding qualities of the tractive unit so require.

6.3. - The back-rest must be secured firmly to the seat, must be curved and be covered with porous material which allows the body to perspire normally.

6.3.1. - It is recommended that the back-rest should measure at least 420 x 450 mm.

6.3.2. - It is recommended that the back-rest should be inclined at an angle of 5 to 7° from the vertical.

6.3.3. - It is recommended that the back-rest should have a frontal curvature of 10 to 20 mm, at a height of 180-230 mm above the level of the seat when in use.

6.3.4. - When arm-rests are provided, it is recommended that their height should correspond to that of the elbows in the seated position, that they should be lightly upholstered and easy to fold out of the way.

6.4. - Foot-rests are necessary. They must be inclined at an angle of 15-25° towards the driver.

6.4.1. - Their surface must not be slippery and they should be rectangular and measure about 400 x 500 mm.

6.4.2. - The pedal(s) operating automatic vigilance devices must be combined with the foot-rests.

7 - DRIVING AND CONTROL EQUIPMENT

7.1. - Arrangement of the equipment

7.1.1. - Driving and testing equipment, etc., which is not required for normal running should not be placed on the desk, in order to avoid the possibility of the driver's attention being distracted from the track.

7.1.2. - Driving equipment and control equipment must be arranged in a functional and logical manner, both individually and in relation to one another.

Every possible step must be taken to ensure that driving equipment and control equipment work in the same direction.

7.1.3. - Maximum uniformity must be promoted as regards the driving and control equipment used in the different tractive units and traction systems and in the way such equipment is arranged.

7.1.4. - Unless pictograms are provided, the relevant captions must be short and to the point; the pictograms and captions must be placed as close as possible to the driving and control equipment concerned.

7.1.5. - A timetable holder must be provided in close proximity to the driver and within his range of vision.

7.2. Driving equipment

All driving equipment used for normal running must be near to the driver and, as far as possible, grouped together on his desk.

7.2.1. Driving equipment which is in frequent use, such as the control handle, brake valve lever, etc., must be placed conveniently near to the driver's hand, when he is seated in a position facing the track. The relative arrangement and shape of the equipment must be such that their operation does not give rise to fatigue, even on a long journey.

7.2.2. - Driving equipment such as audible signal controls, which must be operated quickly in certain special cases, or in the event of danger, must be arranged in such a way that it can be operated without error, even in the dark.

7.2.3. - Special provisions are applicable for the working direction of the main driving equipment (see UIC Leaflets 617-3 and 625-5).

7.2.4. - It is recommended that the same direction be used for turning on all switches of the same type :

- rotating switches : clockwise ;
- toggle switches : forwards or upwards.

7.2.5. - It is recommended that the handles should be of non heat-conducting and non-reflective material.

7.3. Control equipment

7.3.1. - The audible signals designed to attract the driver's special attention must be limited in number, clearly audible above the noise inside the cabin, and distinguishable from one another.

7.3.2. - All control equipment to be monitored during normal running must be within the clear field of vision of the driver and must, as far as possible, be grouped together on the desk.

7.3.3. - The control equipment must be placed within the driver's range of vision and arranged in such a way that it can be read, by day or night, without difficulty and without risk of the driver being dazzled.

7.3.4. - The signal lamps used must be as few in number as possible. Several pilot lamps may be replaced by a general warning lamp placed in the direct field of vision.

7.3.5. - The symbols identifying the pilot lamps must be chosen functionally and be common to the different traction systems (see also UIC leaflets 617-2 and 627-3).

7.3.6. - The normal positions of the needles of apparatus with a dial must, as far as possible, be identical.

7.3.7. - The rotation or movement of the dial needles must, as far as possible, follow the same direction.

8 - WINDOWS OF DRIVERS' COMPARTMENTS

8.1. - To enable the driver and the second man, if any, to observe the track and all the visual signals correctly and, in particular, in order to comply with the regulations contained in UIC Leaflets 617-4 and 625-2, windows of adequate dimensions must be provided in front of their respective seats.

8.1.1. - In the case of locomotives, the height above the level of the floor (on which the driver stands when driving in that position), of the upper edge of the front window or the heated second pane, in cases where the latter is provided, must not be less than 1700 mm.

8.2. - The arrangement of the front windows in relation to the external visual signals and the internal sources of light, etc., must be such that crews cannot be led into making a mistake or inconvenienced by reflections.

8.3. - The front windows must be fitted with adjustable blinds or other devices by means of which crews can protect themselves from dazzle by the sun, headlights, etc. If transparent panes are used, these must not distort the colours of the signals.

8.4. - The front windows must be equipped with a windscreen wiper and efficient anti-freeze and demister devices of adequate size.

8.5. - Each of the two sides or side doors must be provided with at least one side window through which, when open, crews shall be able to lean out or put their arms out (see paragraph 2.2.1).

8.6. - The regulations contained in UIC Leaflets 617-4 and 625-2 shall apply to the manufacture of all windows built into driving compartments, particularly from the point of view of ensuring the protection of crews.

9 - CONDITIONS OF LIGHTING AND BRIGHTNESS

It must be possible in daylight for all the details in the driver's compartment, as well as the means of access and exit, to be easily distinguishable.

9.1. - It is recommended that a general lighting scheme be adopted which guarantees 30 Lux continuously at floor level and 60 Lux at driver's desk level. After this general lighting has been switched off, there must remain sufficient light in the driver's compartment to enable the crew to see to move about without difficulty.

9.2. - The lighting of instruments and of the timetable holder must be non-dazzling, distinct from the general lighting and progressively variable (adjustment not obligatory for the speed indicator).

When additional lamps are provided, these must not dazzle the driver.

10. - FLOOR

10.1. - The driver's compartment must have a smooth floor surface.

10.2. - The material used for floor-covering must be non-slip and easy to clean as well.

11. - OTHER ACCESSORIES

11.1. - It is recommended that there should be a clothes cupboard or recess measuring a minimum of 350 x 300 x 1500 mm. Two additional coat-pegs must also be provided.

11.2. - When there is no room for a cupboard, a locker measuring a minimum of 350 x 150 x 450 mm must be provided for personal effects.

11.3. - When no free space exists on the desk, a folding table should be provided.

11.4. - When long journeys are involved, it is recommended that a cabinet be provided where food can be warmed up and, in particularly warm countries, where it can be kept cool.

11.5 - Easy-to-empty ashtrays and litter bins must be provided in easily accessible places.

12 - FOOTBOARDS (see Appendix 3)

12.1. - The steps must be in the same vertical plane and equidistant from one another. This distance must not exceed 450 mm. The bottom step must be as low as permitted by the gauge (see UIC Leaflet 505-1).

12.2. - The steps must be the same width of 300 mm minimum, and a minimum of 150 mm in depth.

12.3. - The steps must be non-slip, if possible in all weather conditions.

13 - HAND RAILS AND DOOR HANDLES (see Appendix 3)

13.1. - A hand rail must be provided symmetrically on each side of the doors and footboards. The distance from the lower extremity of the hand rail to the upper rail level should not exceed 1250 mm. The distance from the top end of the hand rail to the driving compartment floor level must not be less than 1200 mm.

13.2. - The hand rails must be rounded and not have any cutting edges. They must be fixed to the locomotive side solely at each end. There must be adequate space between them and the engine side to enable them to be gripped easily, held on to with safety and cleaned without difficulty.

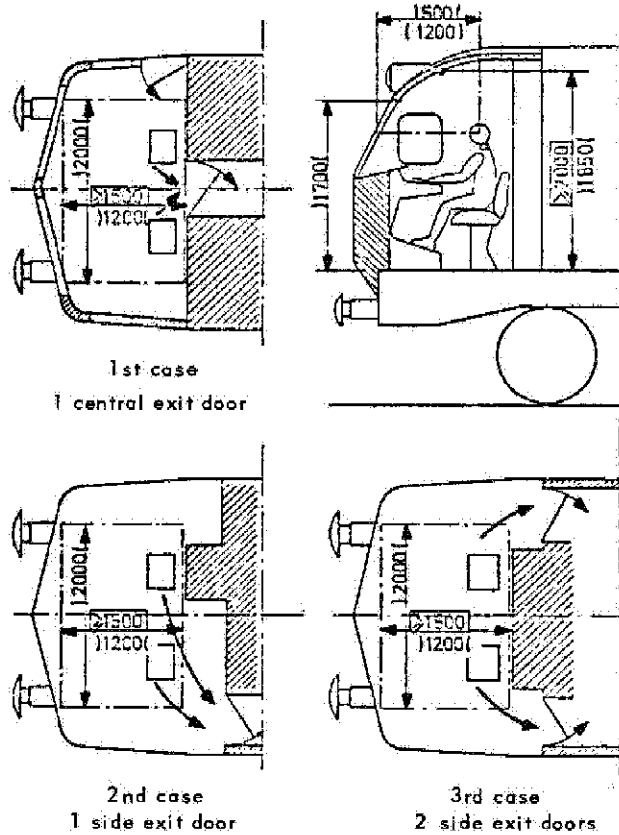
13.3. - The external opening handles of the compartment access doors must, wherever possible, be accessible from the ground ; otherwise, a second handle must be provided in the lower part of the doors.

13.4. - The rotational axis of the handles must be at a minimum distance of 80 mm from the lower edge of the door and 50 mm from the side edge. This distance of 80 mm shall also apply for fixed handles. The space between the handle and surface of the door must be at least 50 mm.

13.5. - The handles must be at least 120 mm long and rounded.

617-6
OR
APPENDIX 1

DRIVERS' COMPARTMENTS

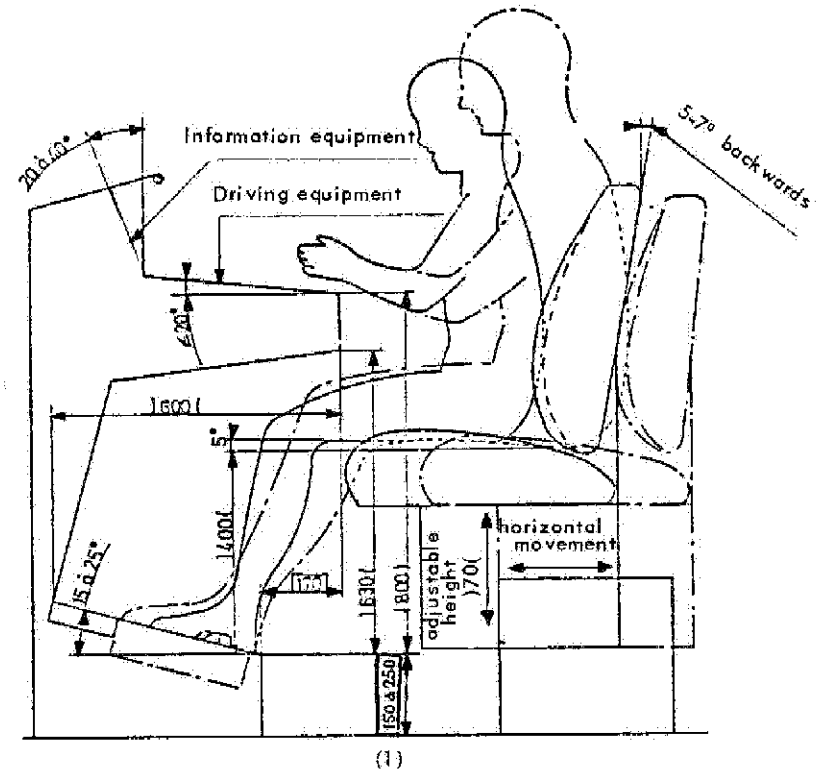


- Recommended value
- └─ Minimum value
- ┌─ Maximum value

Remarks : The doors may be hinged differently. They may also be of the sliding type (see UIC Leaflet 617-5).

617-6
OR
APPENDIX 2

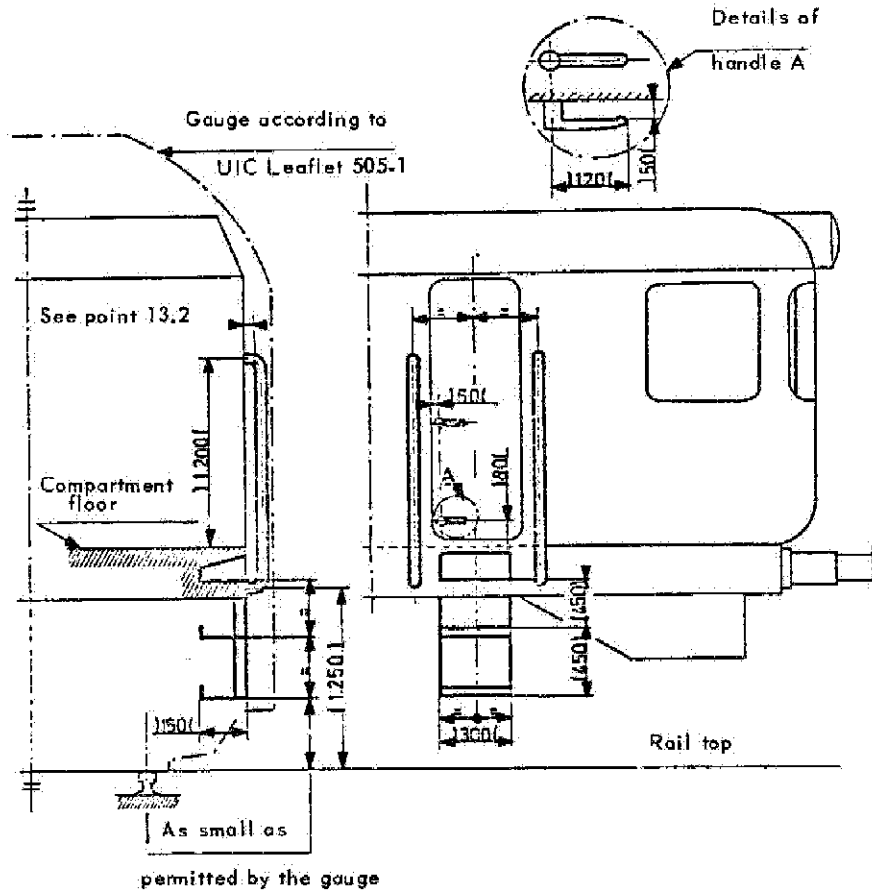
DRIVER'S DESK



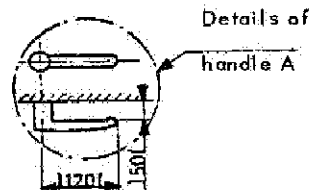
- Recommended value
- └─ Minimum value
- ┌─ Maximum value

(1) Recommended value for driving in the standing position.

FOOTBOARDS, HAND RAILS AND DOOR HANDLES



— (Minimum value
 — [Maximum value



APPLICATION

For obligatory provisions (see point 1):

1. with effect from 1.1.1977 for equipment to be designed,
2. with effect from 1.1.1982 for equipment to be built.

1-1-87

The provisions of this leaflet are only valid for vehicles designed up to 31.12.85. In case of major transformation work on these vehicles, every effort must be made to apply the provisions of Leaflet 651. The provisions to be observed for vehicles designed as from 1.1.86 are those contained in Leaflet 651.

All Railways in the Union.

RECORD REFERENCES

Latest heading under which the question has been studied:

- Question 5/A/FIC - Revision of leaflets (Traction and Rolling Stock Committee, Dublin, June 1985; Paris, June 1986 - Sub-Committee for Motive Power Units, Paris, January 1986, January 1987).