Bus door safety systems

1. Scope

1.1. This specification sets the criteria for the design of a bus door safety system which is intended to prevent passengers from being trapped in the doors of a moving bus.

1.2. A door safety system meeting the criteria in this specification will prevent the bus from moving, or stop it, if already moving. This will minimise any chance of injury to a passenger. The door safety system will also limit the door closing force in some positions of the door.

1.3. This specification only applies to buses fitted with a driver controlled door.

2. General requirements

2.1. Each passenger access door will be fitted with a door safety system as described in this specification.

2.2. The door safety system will operate:
   - Without driver intervention
   - Whenever the engine ignition key is in the ‘on’ position
   - In the case of a stored energy system, whenever there is sufficient energy to operate the door (see Clause 2.8).

2.3. The door system may or may not automatically reopen when the door safety system is activated.

2.4. The door safety system will be capable of detecting a 20mm diameter rod.

Note: The rod is intended to simulate the thickness of the wrist of a child.

2.5. The door safety system will detect the rod at all vertical positions of the rod when placed on the door step up to 1500mm from the door step.

2.6. When the rod is detected, the door safety system will prevent movement of the bus or stop it, if already moving, by:
   - Mechanically or electronically securing the engine in idle mode
   - Applying the brakes on at least one axle or by locking the driveline.

2.7. The control of the braking or driveline system will be designed so that it will not cause the brakes or driveline mechanism to apply while the bus is in motion if there is no controlled operation of the door system.

Note: This can be achieved by disarming the brake or driveline control once a pre-set speed (nominally 10 km per hour) has been reached.
2.8. The operation of the door safety system will not affect the compliance of the bus with any Australian Design Rule in particular, any braking rule. If the braking system uses stored energy, the brake system will be preferentially supplied.

2.9. When the door is being closed, the steady force applied to an object which is located at any position up to 1500mm above the door step will not exceed 150N when measured from 20 millimetres to 300 millimetres from the fully closed position (see Appendix A).

2.10. An audible warning and/or visual warning will be given to alert the driver the door safety system has activated. If only a visual warning device is installed, it will be located in the area of the driver’s normal driving controls and be marked with or display the word “DOOR FAULT”. An audible warning device which reproduces a recorded message will read “DOOR FAULT”.

2.11. When activated, the door safety system will only be capable of being deactivated by a reapplication of the door control.

2.12. Any emergency door release control or other device fitted to a door system will not be rendered ineffective by the installation of a door safety system.

2.13. The correct operation of the door safety system will be capable of being readily checked without the use of special tools or dismantling any component. In the case of components which have ‘normally open’ circuits, there will be a method of automatically checking the integrity of the circuit.

2.14. The door safety system will operate reliably under the full range of environments likely to be encountered during bus operation. This includes extremes of temperature and cleaning with pressurised water.

Note: rubber or plastic components might perform differently over a range of temperatures such as the flexibility of a door seal.

2.15. All components will be located or designed to minimise the risk of passengers tampering with their operation.

3. Checking the door safety system performance

3.1. Place a 20mm diameter rod between adjacent door panels in a two-piece door system or, in the case of a door closing to one side, between the edge of a door panel and the door frame.

3.2. The rod will be perpendicular to the vertical edge of the door and the end of the rod will protrude no more than 30mm beyond the inside surface of the door (see Appendix B).

3.3. Close the door using the normal door closing control.

3.4. Hold the rod loosely so that when the door makes contact the rod will self-align with the door closing geometry.

3.5. Once the rod is detected:

- The door may or may not automatically reopen.
- The engine will remain at or go to idle speed and be incapable of increasing engine revolutions.
- The vehicle shall be immobilised by locking the brakes on at least one axle or by locking the driveline.
- An audible and/or visual warning will be given to alert the driver that the interlock function has operated.
3.6. Open the door using the normal door control, or in the case of an automatic opening door safety system, operate the door control to release the brakes or driveline lock and throttle control.

3.7. Operate the engine throttle and attempt to move the bus to ensure the brakes or driveline lock and throttle control have released.

3.8. Close and open the door again to ensure normal vehicle operation.

3.9. Check the rod sensing operation at all vertical positions from the rod sitting on the door step up to 1500mm from the door step.

3.10. Using a suitable gauge, check the door closing force between 20mm and 300mm to ensure it does not exceed 150 N at all vertical positions up to 1500mm from the door step.

   Note: In order to assess the correct performance of the door safety system it might be necessary to disarm or override some of the automatic functions.

4. Certification

4.1. A plate or label made of durable material will be fitted adjacent to the vehicle manufacturer’s compliance plate. The plate or label display the following information:

   The name of the door safety system manufacturer; the person who installed the door safety system and the statement:

   “The door safety system fitted to this bus has been manufactured and installed to comply with RTA Technical Specification No. 146 “Bus Door Safety Systems”.

4.2. Where the door safety system uses the braking system to immobilise the bus, a certification is required by a Roads and Maritime Services approved Vehicle Safety Compliance Certification Scheme (VSCCS) licensed certifier (see VSCCS Bulletin 1 – Licensed Certifiers).
Appendix A  Closing force test

Appendix B  Detection test