Doc No. TED 29 (19145) W
August 2022

DRAFT AMENDMENT NO. 2 AUGUST 2022
TO
IS 14225: 2017 AUTOMOTIVE VEHICLES – LOCKING SYSTEMS AND DOOR RETENTION COMPONENTS – GENERAL REQUIREMENTS
(*First Revision*)

(*Foreword, para 4*) - Add the following after the para:

'In view of GTR 1 developed considering M1 and N category vehicles, scope of GTR1 and equivalent European standards does not cover M2 and M3 category Vehicles. The same was consideration while developing revision 1 of IS 14225: 2017 and hence M2 and M3 category vehicles were not included in revision.

It was realised that IS 14225:1995 included requirements for M2 and M3 category vehicles which were dropped in GTR aligned revision of IS 14225:2017. The subject was discussed during the 9th Meeting of SC TED 29 and the committee felt that it is not appropriate to apply GTR requirements to M2 and M3 category vehicles as GTR was never developed for such category of vehicles. Hence, it was decided to add a separate section (Section 2), for M2 and M3 category vehicles with requirements aligned to IS 14225:1995 which are India specific requirements for M2 and M3 category vehicles.**'**

(*Foreword, line 9*) - Substitute the following for the existing:

'The Committee responsible for the formulation of this standard is given in Annex G.**'**

(*Page* **1,** *clause* **1**) Substitute following for the existing clause:

'1 SCOPE

1.1 Section 1 of this standard applies to the vehicles of categories L7, M1 and N as defined in IS 14272 : 2011 'Automotive vehicles — Types — Terminology (first revision)' with respect to latches and door retention components such as hinges and other supporting means on doors, which can be used for the entry and exit of the occupants. This section applies to vehicle door locks and door retention components on side or back doors that lead directly into a compartment that contains one or more seating accommodations in vehicles of category L7, M1 and N.

1.2 Section 2 of this standard specifies requirements for side door including emergency door locks and side door retention components including latches, hinges and other supporting means, fitted on vehicles of categories M2 and M3 as defined in IS 14272 to minimize the likelihood of occupants being thrown out from the vehicle as a result of any impact.

1.3 Both Section 1 and Section 2 of this standard do not apply to those vehicles which are not normally provided with a door.

1.4 Vehicles of categories M2 and M3 may be type approved as per Section 1 of this standard, based on mutual agreement between Test agency and vehicle manufacturer.

1.5 Vehicles of categories M2 and M3 complying with the requirements of Section 1 shall be deemed to comply with requirements of Section 2 of this standard.

1.6 Vehicles of categories M2 and M3 complying with the requirements of IS 14225:1995 are deemed to comply with requirements of IS 14225:2017.**'**

(*Page* **1,** *clause* **2**) Add following Heading after the existing clause:

'SECTION 1 REQUIREMENTS FOR L7, M1 and N CATEGORY VEHICLES'

(*Page* **15,** *Annex E*) – Add following before the Annex:

'SECTION 2 REQUIREMENTS FOR M2 AND M3 CATEGORY VEHICLES

7 TERMINOLOGY

7.1 Side Front Door — A door that, in a side view, has 50 percent or more of its opening area forward of the rearmost point on the driver's seatback, when the driver's seat is adjusted to its most vertical and rearward position.

7.2 Side Rear Door — A door that, in a side view, has more than 50 percent of its opening area to the rear of the rearmost point on the driver's seatback, when the driver's seat is adjusted to its most vertical and rearward position.

7.3 Latch — A mechanical device employed to position the door in a closed position relative to the vehicle body with provision for controlled release (or operation).

7.3.1 *Latch Components*

7.3.1.1 *Plante* — The main body or frame for supporting working components, appendages and transmitting or distributing loads to the door structure.

7.3.1.2 *Rotor (Bolts)* — The rotating or sliding member of the latch which engages and restrains the latch to the striker.

7.3.1.3 *Ratchet* — A member of the latch connected to the rotor to provide an abutment or abutments which, when properly indexed, become engaged with a related pawl to prevent motion of the rotor in one direction.

7.3.1.4 *Pawl* — A member of the latch that can be operated to engage the abutments of the ratchet to prevent relative motion between the two parts except in one direction.

7.4 Striker — A Mechanical device with which the latch engages on the opposing member or the body.

7.5 Fully Latched Position — The Position that exists between the latch and striker when the door is secured in the fully closed position.

7.6 Secondary Latched Position — The position that exists between the latch and striker when the latch holds the door in a partially closed position.

NOTE — The secondary latched position may be included in the side door latch, as an added mechanical feature to reduce the possibility of the door opening freely, in the event the door is not closed to the fully latched position. It shall be recognized that doors are intended to be in the fully latched position whenever the vehicle is in motion.

8 GENERAL REQUIREMENTS

Following components on any side door leading directly into a compartment that contains one or more seating accommodations shall conform to this standard and shall pass the tests as per test procedures in **9**.

8.1 Hinged Doors

8.1.1 *Door Latches*

Each door latch and striker assembly shall be provided with two positions consisting of:

a) A fully latched position; and
b) A secondary latched position.

8.1.1.1 *Longitudinal load (Load test one).*

The door latch and striker assembly, when in the fully latched position, shall not separate when a longitudinal load of 1135 kgf is applied. In the secondary latched position, the door latch and striker assembly shall not separate when a longitudinal load of 455 kgf is applied.

8.1.1.2 *Transverse load (Load test two).*

The door latch and striker assembly, when in the fully latched position, shall not separate when a transverse load of 910 kgf is applied. In the secondary latched position, the door latch and striker assembly shall not separate when a transverse load of 455 kgf is applied.

8.1.1.3 *Inertia Load*

The door latch shall not disengage from the fully latched position when a longitudinal or transverse inertia load of 30 g is applied to the door latch system (including the latch and its actuating mechanism with the locking mechanism disengaged).

8.1.2 *Door Hinges*

Each door hinge system shall support the door and shall not separate when a longitudinal load of 1135 kgf is applied. Similarly, each door hinge system shall not separate when a transverse load of 910 kgf is applied.

8.1.2.1 Hinges shall be mounted at the front edge of the door in the direction of forward travel.

8.1.3 Each door except the driver's door, shall be equipped with a locking mechanism with means of operating from the interior of the vehicle.

8.1.3.1 *Driver's side door*

On the driver's side door, the locking mechanism shall be operable from the exterior.

8.1.3.2 When the locking mechanism is engaged the outside door handle or outside latch release control shall be inoperative.

8.1.3.3 When the locking mechanism is independent of the interior door handle and when the locking mechanism is engaged, both outside and inside door handle or latch release control shall be inoperable.

8.2 Sliding Doors

The track and slide combination or other supporting means for each sliding door shall not separate when a total transverse load of 1820 kgf is applied, with the door in the closed position.

9 TEST PROCEDURES

9.1 Hinged Doors

9.1.1 *Doors Latches*

9.1.1.1 *Longitudina1 (Load test one) and transverse loads (Load test two)*

Compliance to **8.1.1.1** and **8.1.1.2** for checking the procedure as given in Annex E shall be followed.

9.1.1.2 *Inertia load*

Compliance with **8.1.1.3** shall be proved by approved tests or in accordance with procedure given in Annex E.

9.1.2 *Door Hinges*

Compliance with **8.1.2** shall be listed in accordance with procedure given in Annex F. For piano type hinges, the hinge spacing requirements of Annex F shall not be applicable and arrangement of the test fixture shall be altered as required so that the test load may be applied to the complete hinge.

9.2 Sliding Doors

Compliance with **8.2** shall be checked by applying an outward transverse load of 1000 kgf of the load bearing members at the opposite edges of the door (2000 kgf total). The testing may be performed either on the vehicle or with the door retention components in a bench fixture.

ANNEX E

(*Clauses* **9.1.1.1** and **9.1.1.2**)
THE REQUIREMENTS FOR HINGED DOORS AND LATCHES

E-1 REQUIREMENTS

E-1.1 Longtiudinal Load

A door latch and striker assembly, when tested as described under test procedures, shall be able to withstand an ultimate longitudinal load of 1135 kgf when in the fully latched position and 455 kgf when in the secondary latched position.

E-1.2 Transverse Load

A door latch and striker assembly, when tested as described under test procedures, shall be able to withstand an ultimate transverse load of 910 kgf when in the fully latched position (*see* **E-2.3**) and 455 kgf when in the secondary latched position.

E-1.3 Inertia Load

A door latch system (including the door latch, striker assembly, outside handle, key cylinder and any connection mechanisms) in the fully latched position, when evaluated by calculation, shall remain in the fully latched position when subjected to an inertia load of 30 g in any direction.

E-2 STATIC TESTS

E-2.1 Longitudinal Load (Load test one) (Fully Latched Position)

E-2.1.1 *Purpose*

To determine the ability of the vehicle latch and striker to withstand a test perpendicular to the face of the latch.

E-2.1.2 *Equipment*

Tensile testing machine.
Static test fixture (*see* Fig. 10)

E-2.1.3 *Operation*

Attach the test fixture to the mounting provisions of the latch and striker. Align the direction of engagement parallel to the linkage of the fixture. Mount fixture with latch and striker in fully latched position in the test machine so as to apply a load perpendicular to the face of the latch.

Locate weights to apply a 90 kgf load tending to separate the latch and striker in the direction of the door opening.

Apply the test load at a rate not exceeding 5mm per minute until failure occurred or till 1135 kgf. Record maximum load.

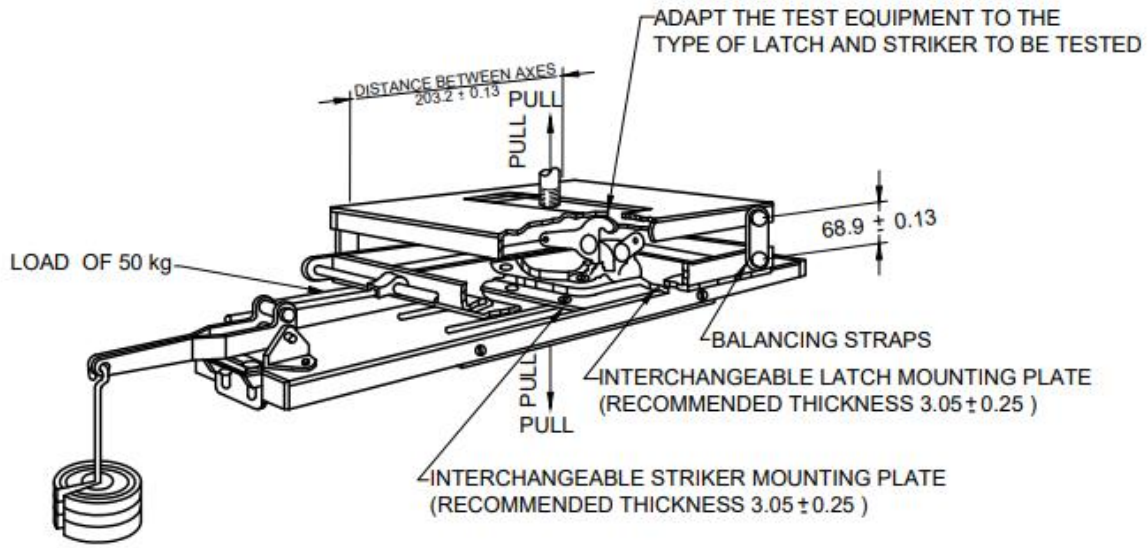
E-2.2 Longitudinal Load or Load Test One (Secondary Latched Position)

E-2.2.1 *Purpose*

To determine the ability of the vehicle latch and striker in the secondary position to with-stand a test load perpendicular to the face of the latch.

E-2.2.2 *Test Equipment*

a) Tensile testing machine
b) Static test fixture (*see* Fig. 10)



All dimensions in millimetres.

FIG. 10 DOOR LATCH-TEST EQUIPMENT UNDER STATIC LOAD (LONGITUDINAL LOAD)

E-2.2.3 *Procedure*

Attach the test fixture to the mounting provisions of the latch and striker. Align the direction of engagement parallel to the linkage of the fixture. Mount fixture with latch and striker in secondary latch position in the test machine so as to apply a load perpendicular to the face of the latch.

Locate weights to apply a 90 kgf load tending to separate the latch and striker in the direction of the door opening.

Apply the test load at a rate not exceeding 5 mm per minute until failure occurred or 455 kgf. Record maximum load.

E-2.3 Transverse Load or Load Test Two (Fully Latched Position)

E-2.3.1 *Purpose*

To determine the ability of the vehicle latch and striker to withstand the test load in the direction of door opening.

E-2.3.2 *Equipment*

a) Tensile testing machine, and
b) Static test fixture (*see* Fig. 11).

E-2.3.3 *Procedure*

a) Adapt the test fixture to the mounting provisions of the latch and striker. Mount fixture with the latch and striker in fully latched position in the test machine so as to apply a load in the direction of door opening.
b) Apply the test load at a rate not exceeding 5 mm per minute until failure occurred. Record the maximum load.

E-2.4 Transverse Load or Load Test Two (Secondary Latched Position on the Assembly)

E-2.4.1 *Purpose*

To determine the ability of the vehicle latch and striker in the secondary position to with stand the test load in the direction of door opening.

E-2.4.2 *Test Equipment*

a) Tensile testing machine
b) Static test fixture (*see* Fig. 11)

E-2.4.3 *Operation*

a) Adapt the test fixture to the mounting provisions of the latch and striker. Mount fixture with the latch and striker in secondary latched position in the test machine so as to apply a load in the direction of door opening.
b) Apply the test load at a rate not exceeding 5 mm per minute until failure occurred. Record the maximum load.

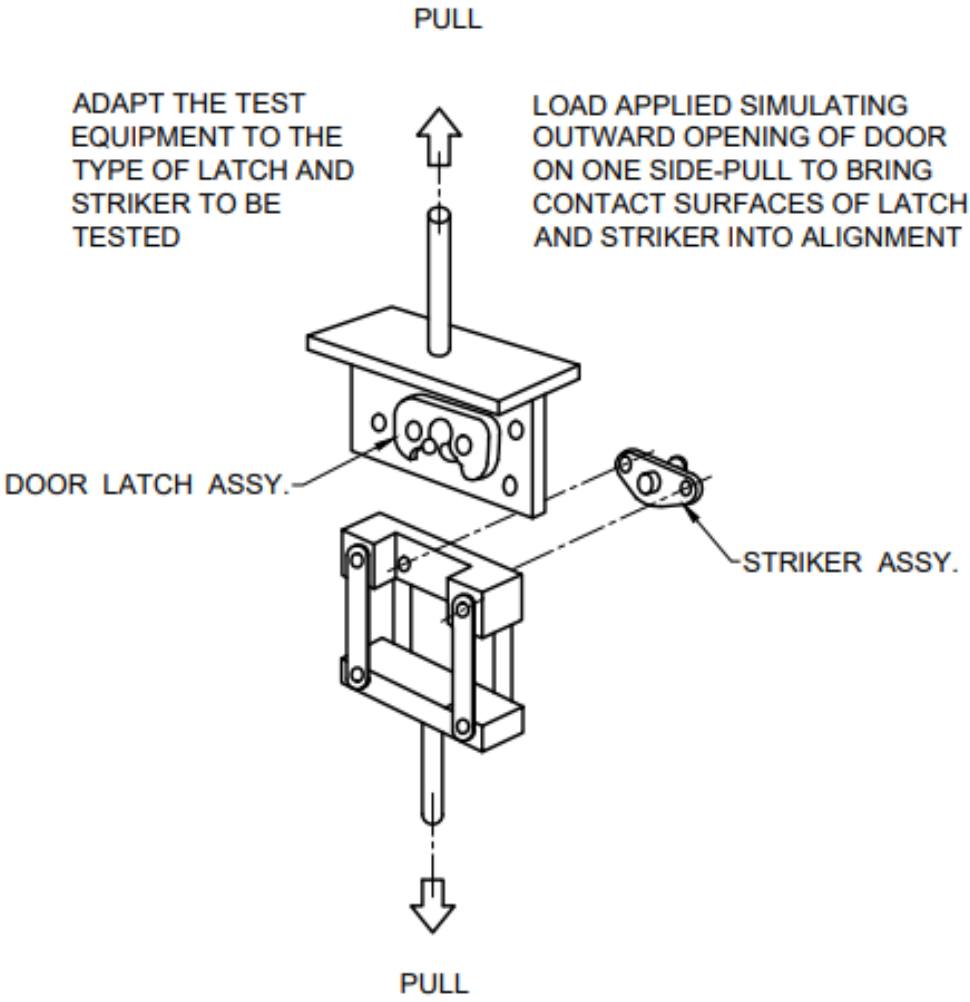


FIG. 11 DOOR LATCH-TEST EQUIPMENT UNDER STATIC LOAD (TRANSVERSE LOAD)

E-3 INERTIAL LOAD ANALYSIS (MATHEMATICAL)

E-3.1 Purpose

To determine the ability of the vehicle latch system to resist inertia loading by mans of a mathematical analysis of the component parts in actual mounting on vehicles covered in Section 2.

NOTE — Due to the complexity of physical testing for inertial characteristics it is more practical and more accurate to base evaluations on mathematical analysis. The procedure described in this section provides a means for analytically determining the ability of a door latch system to withstand inertia loading. Spring forces are the average of the minimum spring output in release position friction effects and work to be done are not considered in the calculations. Gravitational pull on components may also be omissions if it tends to restrict unlatching. These omissions from the calculations are permissible because they provide additional factors of safety.

E-3.2 Calculations

For each component or subassembly, its minimum inertia load resistance in a particular direction may be calculated. Their combined resistance, to the unlatching operation, shall assure that the door latch system (when properly assembled in the vehicle door) shall remain latched when subjected to an inertia load of 30 g in any direction Fig. 12 illustrates the components and combinations of components to be considered for purposes of calculations.

A door latch system subjected to a deceleration of 30 g

$F = Ma = \frac{W}{g}$ a = $\frac{W}{g}$ 30 g = 30 W

F_1 = W_1 × 30 – Average load on knob spring = (0·016 kg × 30) – 0.454 kg + 0.036 kg

F_2 = W_2 × 30 = 0.023 kg × 30 = 0.68 kg

$F_3 = \frac{W_a}{2} \times 30 = \frac{0.012\ kg}{2} \times 30$ = 0.184 kg

B $M_o = F_1 \times d_1 + F_2 \times d_2 - F_3 \times d_3$ = 0.036 kg × 31.5 mm + 0.68 kg × 10.67 mm – 0.184 kg × 4.83 mm = 7.51 mm kg

$F_5 = \frac{M_0}{d_4} \times \frac{7.51}{31.5} = 0.238$ kg

$F_6 = W_4 \times 30 = 0.042 \times 30 = 1.265$ kg

B M_p = Load on bolt spring – ($F_5 d_5 + F_6 d_6$) 45.62 mm kg – (0.238 × 37.59 × + 1.265 × 1.9) = 45.62 mmkg – 11.36 mmkg = 34.26 mmkg

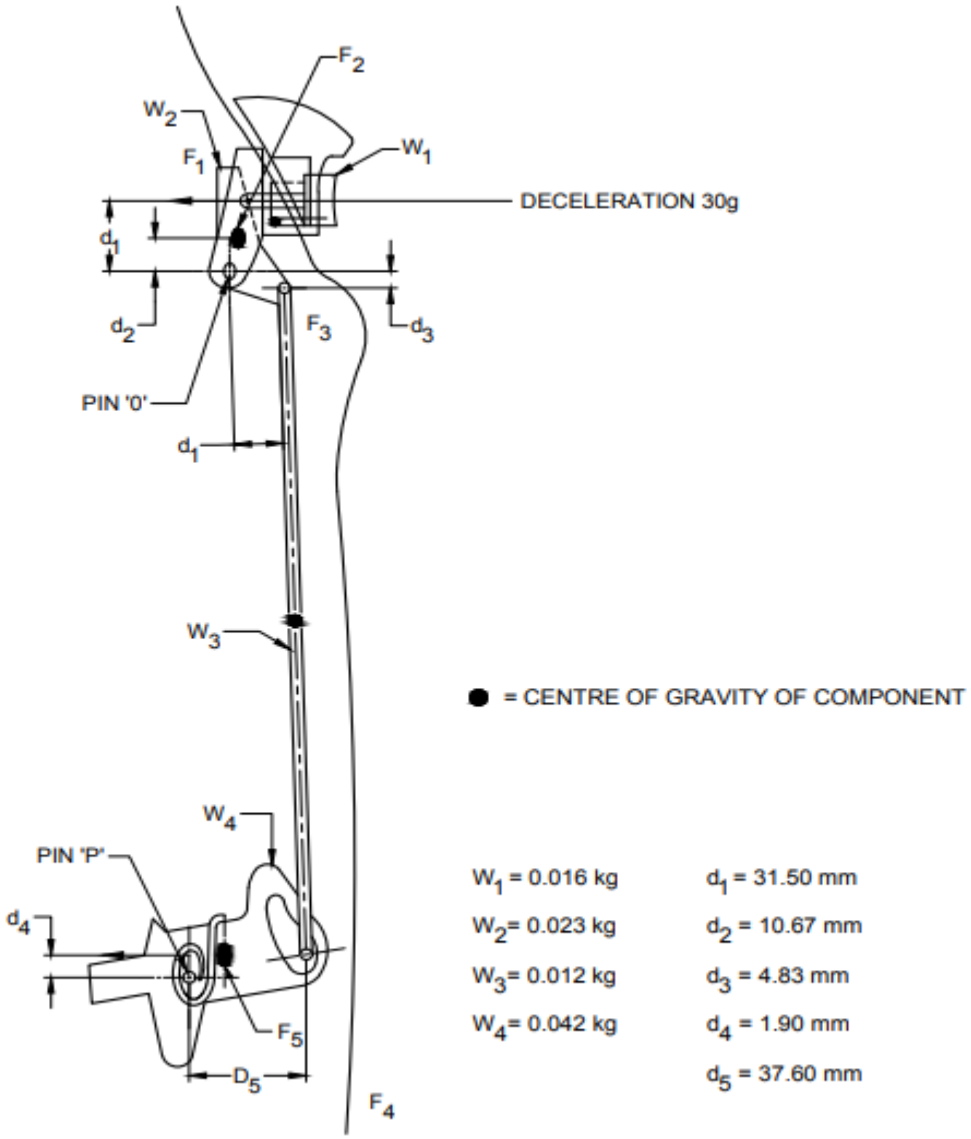


FIG. 12 RESISTANCE TO THE EFFECT OF INERTIA EXAMPLE OF CALCULATION

ANNEX F
(*Clause* **9.1.2)**

TEST REQUIREMENTS FOR DOOR HINGE SYSTEM

F-1 REQUIREMENTS

F-1.1 Longitudinal Load (Load Test One)

A vehicle passenger door hinge system, when tested as prescribed under test procedure in, **F-2.1** must be capable of withstanding an ultimate longitudinal load of 1135 kgf.

F-1.2 Transverse Load (Load Test Two)

A vehicle passenger door hinge system, when tested in accordance with the test procedure in **F-2.1**, must be capable of withstanding an ultimate transverse load of 910 kgf.

F-2 STATIC TESTS

F-2.1 Longitudinal (Load Test One) and Transverse Load (Load Test Two)

F-2.1.1 *Purpose*

To determine the ability of the vehicle hinge system to withstand a test load in the longitudinal as well as transverse vehicle direction.

F-2.1.2 *Equipment*

a) Tensile testing machine
b) A typical test fixture as illustrated in Fig. 13.

F-2.1.3 *Operation*

a) Attach a test fixture to the mounting provision of the hinge system. Hinge attitude shall simulate vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the distance between the extreme end of one hinge in the system to the extreme end of another hinge in the system is to be set at 406 mm. The load is to be applied equidistant between the linear centre of the engaged portions of the hinge pins and through the centreline of the hinge pin in the longitudinal as well as transverse vehicle direction.

b) Apply the test load at a rate not exceeding 5 min per minute until failure occurred. Separation of either hinge is deemed a failure. Record maximum load.

F-3 SINGLE HINGE EVALUATION

F-3.1 Purpose

In some circumstances, it may be necessary to conduct eva1uotions of individual hinge in a hinge system. In such cases, the results for an individual hinge, when tested in accordance with the procedures in **F-3.2** for longitudinal and transverse shall be such as to indicate that system requirements in **F-1.1** and **F-1.2** are met.

F-3.2 Test Procedures

F-3.2.1 *Longitudinal (Load Test One) and Transverse Load (Load Test Two)*

Attach a test fixture to the mounting provision of the hinge. Hinge attitude shall simulate the vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the load is to be applied equidistant between the linear centre of the engaged portions of the hinge pin and through the centreline of the hinge pin in the longitudinal as well as transverse vehicle direction.

F-3.2.1.1 Apply the test load at a rate not exceeding 5 mm per minute until failure occurred. Separation of either hinge constitute a failure. Record maximum load.

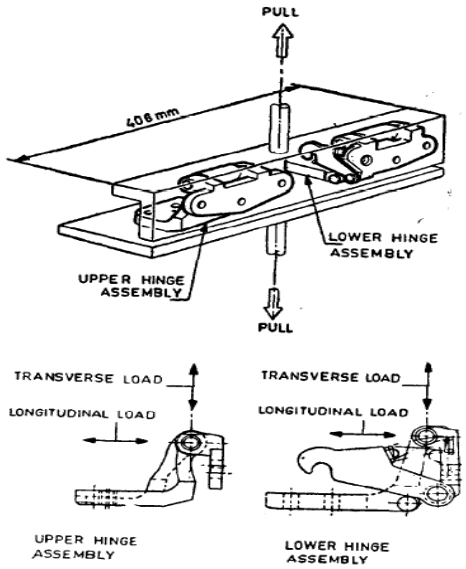


FIG. 13 DOOR HINGE SYSTEM STATIC LOAD FIXTURE (TRANSVERS LOAD)**'**

(*Page* **15**, *ANNEX E*) – Rename ANNEX E as ANNEX G.