

Testing of BT toolboxes as side guard protection device according to Directive 89/297/EEC

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Assignment Testing of BT Toolboxes as side guard protection device according to Directive 89/297/EEC

This report refers to the same test series reported in Research Report VTTIRTE V168/05.

Samples The customer supplied BT Toolbox samples to VTT 19.7.2005. The shipment contained toolboxes BT 240 A, BT Rst 240 A, BT 270 A, BT 420 A and BT Kombi model dual doors with frame but without the compartment part. The BT 420 A was supplied as installed to vehicle U-beam frame section using customer type frame brackets. The shipment also contained vehicle I-beam frame section fixture and the appropriate attachment kit. For this test series the manufacturer designations were used for specimen identification purposes.

The toolboxes BT 420 A and BT Kombi were fitted with door reinforcement plywood plates glued on the inside. The other models (BT 240 A, BT Rst 240 A ja BT 270 A) did not have these.

The material of the supplied toolboxes and mounting brackets were not analyzed. The dimensions of the toolboxes were inspected using the supplied drawing sets. The toolbox door plate thickness was also measured assuming it to be the most significant single factor affecting overall stiffness. On all of the samples the door plate thickness was 1.22 mm.

The selection of the test samples from the BT Toolbox line up was based on negotiation 11.3.2005 by Jarl-Erik Sundblad and Juha Juntunen.

General

The Directive 89/297/EEC section 2.8 defines 1 kN test load applied with a Ø 220 mm ram plate. The allowed deflection is 30 mm at the 250 mm rearmost section of the side guard and 150mm elsewhere.

The vehicle installation dimensional requirements laid down in Directive 89/297/EEC are beyond the scope of this test report.

The results are valid only for the tested samples. The accreditation is only valid for testing. The evaluation and possible conclusions are beyond the scope of accreditation.

Loading tests

In the loading tests the toolbox being tested was installed with the supplied brackets to a vehicle frame mimicking beam that was attached to the laboratory strong floor. This installation permitted loading using a vertical servo hydraulic actuator supported to the laboratory portal loading frame. The actuator had a swivelled 200mm diameter ram plate under which a 2mm thick rubber mat was used. When the loading point was close to the toolbox door lock the rubber mat was replaced with a 10mm thick fiber mat.

The toolbox BT 420 A was tested as installed by the customer to a U-beam type vehicle frame. Toolboxes BT 240 A ja BT rst 240 A were tested as installed to a I-beam type vehicle frame according to customer instructions using the supplied attachments.

After a few loading tests it was discovered that measured deflections practically resulted from deflections of the door and door rubber seal elasticity. As a result the samples BT 270 and BT Kombi were tested without attachments by placing the samples on the laboratory strong floor. The BT Kombi sample had protruding lock mechanism parts because of which the sample frame was mounted on a test frame elevated from the floor.

As the loading device a 10 kN servo hydraulic actuator was used fitted with 10/20 kN Instron load cell nr 087. For deflection measurements two HBM W20 transducers numbers 289 and 290 were used. HBM UPM-60 scanner nr 815 was used as the measuring device. The measured deflection was obtained as the average of the two displacement transducers.

The load applying locations were chosen to include the deflection-wise critical locations that could be expected to yield maximum deflections. For each test sample the loading point numbering is also the performing order. The loading points are also marked on the drawings, see attachment 1. Note that the attachment 1 contains scanned pages from the original research report.

For each loading point the displacement transducers were balanced before testing. Because of this the possible permanent deformations from previous tests cannot be seen in the measured deflections.

Results

The results are presented in table 1. The deflections in table 1 are those obtained with 1 kN test load containing the possible deflections of the attachment and the frame. Because of the characteristics of toolboxes used as a side guard protection device it is not possible to define which side might represent the rear section. However, all the maximum measured deflections fulfil the 30 mm maximum allowed deflection for the rearmost 250 mm section of the side guard device. The measured results are also presented in graphical format in appendix 3.

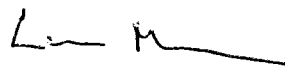
Table 1. Measured deflections with the 1 kN test load.

Sample	Loading point 1 [mm]	Loading point 2 [mm]	Loading point 3 [mm]	Loading point 4 [mm]	Loading point 5 [mm]	Loading point 6 [mm]
BT 420 A	8.3	8.7	9.7	7.1	-	-
BT rst 240 A	8.6	11.0	10.0	6.4	-	-
BT 240 A	7.6	8.8	10.9	8.0	-	-
BT 270 A	7.8	7.8	10.8	-	-	-
BT Kombi	9.1	8.6	6.3	4.3	9.2	6.9

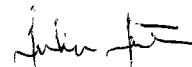
Conclusions

In every test the measured maximum deflections fulfilled the requirements laid down in Directive 89/297/EEC. In addition to the general 150mm maximum allowed deflection also the more stringent 30 mm requirement for the 250 mm rearmost section was fulfilled. On these grounds the tested BT Toolboxes can be considered to fulfil the structural strength requirements as a side guard protection device laid down in Directive 89/297/EEC.

Espoo, 13.10.2010



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Appendices

- Appendix 1 Drawings (From report VTTRTE V168/05)
- Appendix 2 Photographs
- Appendix 3 Test results as graphs (From report VTTRTE V168/05)

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