TÜV AUSTRIA TURK
BELGELENDİRME EĞİTİM VE GÖZETİM
HİZMETLERİ LTD. ŞTİ.
Çamlık Mah. İkbal Cad. Dinç Sk. No:28 PK:34774
Ümraniye/ ISTANBUL – TURKEY
www.tuvaustriaturk.com

Manufacturer	ALPIN MAKINE SAN.VE TIC. A.Ş.
Type	SKID STEER LOADER M60 CAB

Report of Conformity

20-TUV-ATR-COC-0046

ISO 3471
Earth-moving machinery - Roll-over protective structures
Laboratory tests and performance requirements

According to
Test standard

ISO 3471:2008
Earth-moving machinery - Roll-over protective structures
Laboratory tests and performance requirements
Fourth Edition 2008-08-15
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1. GENERAL

Make	ALPİN
Manufacturer	**ALPIN MAKINE SAN.VE TIC. A.Ş.**
Trade name	Not applicable
Type / Variant / Version	See Annex 1
Vehicle description which cab use intended for	SKID STEER LOADER M60 CAB
Vehicles equipped with ROPS	See Annex 1
Name and address of the manufacturer	**ALPIN MAKINE SAN.VE TIC. A.Ş.** 29 Ekim Mah. İzmir-Aydın Karayolu No:7 Yazıbaşı Mevki Torbalı İZMİR - TÜRKİYE
Address(es) of assembly plant	29 Ekim Mah. İzmir-Aydın Karayolu No:7 Yazıbaşı Mevki Torbalı İZMİR - TÜRKİYE
Date of issue of information folder	06.11.2020
Ambient conditions	22 °C / Indoor / 22% humidity

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CALIBRATION EQUIPMENTS		
Equipment	**Serial / Certificate no.**	**Calibration Due Date**
Load cell 40 T	AUTO-080	28.06.2020
Lineer ruler	AUTO-083	16.06.2020
Tape measure	AUTO-003	17.02.2021
Inclinometer	AUTO-029	19.08.2021
Laser measure	AUTO-087	09.03.2020

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LIST OF ANNEXES		
Annex	**No of pages**	**Subject**
1	20	Information document (Document no: M60_R01,Date:06.11.2020)

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MANUFACTURER'S DOCUMENTATION	
Manufacturer's documentation is complete and reflects the agreed specification for the component tested and covers all variants and versions agreed in the worse case rationale.	Fullfilled

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TEST SEQUENCE
Lateral loading
Vertical loading
Longitudinal loading

Clause	Requirements	Result
6.	**Test loading procedure**	
6.1	**General requirements**	
6.1.1	All LAP (Load Application Point) shall be determined and marked on the structure before any loading is applied.	Fulfilled
6.1.2	The loads shall be calculated according to Table 1 and the loading sequence shall be lateral, vertical and longitudinal.	Fulfilled
6.1.3	No straightening or repair is permitted during or between loading sequences.	Fulfilled
6.1.4	The load shall be applied through S (Socket) and LDD (Load distribution device). The socket shall provide unrestricted movement of the ROPS during the loading process. LDD is used to prevent localized penetration of ROPS structural members. S and LDD shall not impede rotation of the ROPS.	Fulfilled
6.1.5	LDD shall not contact a ROPS structural member beyond *H*. (*H* = height of load application zone)	Fulfilled
6.2	**Lateral Loading**	
6.2.1	LDD shall span *L*, in cases where no rear cross-member exists that would be capable of transferring the load without buckling. In all other cases, the device shall not distribute the load over a length greater than 80 % of the ROPS length *L*. For the length, *L*, of curved surfaces, see Figures 3. *(L [W] = length [width] of ROPS for LAP determination)*	Fulfilled
6.2.2	For rollbar ROPS, the LAP shall be on the same plane with the upper lateral cross-member.	Fulfilled

6.2.3	For all other one-post or two-post ROPS, the LAP shall be dictated by the length, *L*, and the vertical projection of the closest side or edge of the DLV. The LAP shall not be within a distance *L*/3 measured from the rear outside face of the ROPS structure. If the *L*/3 point is situated between the back face of the ROPS at the post side and the intersection of the DLV boundary plane (BP) closest to the post(s) with the lateral structural member, the LAP shall be moved away from the post side until it reaches at least the BP of the DLV	Not applicable
6.2.4	For a ROPS with more than two posts, the LAP shall be located between vertical projections of the front and rear BP of the DLV	Fulfilled
6.2.5	Where the operator's seat is off the machine longitudinal centreline, the loading shall be against the external side of the lateral structural member closest to the seat. Where the operator's seat is on the machine longitudinal centreline, if the ROPS structure and mounting are such that different force-deflection results are likely by loading from left or right, the side that is loaded shall be that which will place the most severe loading requirements on the representative specimen.	Not applicable
6.2.6	The initial direction of the loading shall be horizontal and perpendicular to a vertical plane through the machine longitudinal centreline. As loading continues, representative specimen deformations can cause the direction of loading to change. This is permissible.	Fulfilled
6.2.7	The loading may be considered static if the rate of deflection at the LAP is not greater than 5 mm/s. The values of force and deflection, at the LAP, shall be recorded at deflection increments no greater than 15 mm. The loading is to continue until the force and energy levels in accordance with Table 1 have been reached. The measured deflection used in calculating the energy is that of the ROPS along the line of the applied force. Deflection of the ROPS mounting system and machine frame may be included in the total deflection; however, deflection of all test fixture arrangements shall be excluded.	Fulfilled
6.3	**Vertical Loading**	
6.3.1	After completion of the lateral loading, a vertical load shall be applied to the top of the ROPS.	Fulfilled
6.3.2	For all ROPS, the centre of the vertical load shall be applied in the same vertical plane, perpendicular to the longitudinal centreline of the ROPS structure, defined on the structure before deformation from the lateral loading.	Fulfilled
6.3.3	The load on the ROPS is applied without limitation on the manner of distribution, provided it is applied symmetrically with the longitudinal centreline of the deformed ROPS structure	Fulfilled
6.3.4	The rate of deflection shall be such that the loading may be considered static according to the criteria defined in 6.2.7. The loading is to continue until the force level specified in Table 1 has been reached. The structure shall support this load for a period of 5 minutes or until any deformation has ceased, whichever is shorter.	Fulfilled

6.4	**Longitudinal loading**	
6.4.1	After completion of the vertical loading, a longitudinal load shall be applied to the ROPS.	Fulfilled
6.4.2	The longitudinal load shall be applied to the upper structural members of the ROPS along the longitudinal centreline of the ROPS. The LAP is determined using the intersecting planes of the front and top surfaces. If surfaces are curved, determine the intersecting plane by using the tangent line at the mid-point of the arc segment of the top or front member.	Fulfilled
6.4.3	The longitudinal load shall be applied at a location consistent with Figures 1 to 5, established prior to lateral loading. The load distribution device shall span the width in cases where no rear (front) cross-member exists that would be capable of transferring the load without buckling. In all other cases, the device shall not distribute the load over a length greater than 80 % of the width, *W*, of the ROPS	Fulfilled
6.4.4	For all machines, the direction of loading (fore or aft) shall be selected in order to place the most severe requirements on the representative specimen. The initial direction of loading shall be horizontal and parallel to the original longitudinal centreline of the machine. Some factors to consider in deciding on the direction to apply the longitudinal load are the following: a) location of the ROPS relative to the DLV and the effect that longitudinal deflection of the ROPS would have on providing crush protection for the operator; b) machine characteristics, e.g. other structural members of the machine that could resist longitudinal deflection of the ROPS and which can limit the direction of the longitudinal component of loading on the ROPS; c) experience that could indicate the possibility of longitudinal tipping or the tendency of a particular classification of machine to skew as it rotates about a longitudinal axis during an actual roll-over.	Fulfilled
6.4.5	The rate of deflection shall be such that the loading may be considered static according to the criteria given in 6.2.7. This loading is to continue until the force level has been reached.	Fulfilled

7	**Temperature and material criteria**	
7.1	**General ROPS requirements**	
	In addition to the loading requirements, there are material and temperature requirements needed to ensure that the ROPS will have resistance to brittle fracture. The preferred method of meeting this requirement is to fabricate all ROPS structural members from materials that meet the mechanical requirements specified in 7.2 and 7.3. In this case, the ROPS test may be carried out at any desired temperature. In any case, fasteners shall fulfil the requirements of 7.4.	Not applicable
7.2	**ROPS structural members**	
	ROPS structural members -except those made of thin steels- shall be made of steels that meet or exceed one of the Charpy V-notch (CVN) impact strengths in accordance with Table 2. Any thin-steel structural member shall meet the requirements of 7.3. Alternatively, the temperature and material requirements may be met by applying the static loadings with all ROPS structural members at, or below, - 18 °C if material specifications and procurement guarantee that materials in ROPS subsequently manufactured will have toughness characteristics similar to those in the representative specimen tested. NOTE The Charpy V-notch evaluation is primarily a quality control check and the indicated temperature does not directly relate to operating conditions.	Not applicable
	Supplier or manufacturer certifications can be used as evidence of acceptability. Supplier or manufacturer records shall be maintained for all production materials used in structural members.	Fulfilled
	Specimens are to be “longitudinal” and shall be taken from flat stock, tubular or structural sections before forming or welding for use in the ROPS. Specimens from tubular or structural sections shall be taken from the middle of the side of greatest dimension and shall not include welds as defined in ISO 148.	Not applicable
7.3	**Thin steels**	
	The following shall be considered as meeting the Charpy requirement: - steel less than or equal to 2,5 mm in thickness with a maximum carbon content of 0,20 %; - fully killed, fine grained steel of thickness greater than 2,5 mm but lower than or equal to 4,0 mm, with a maximum carbon content of 0,20 %.	Fulfilled
7.4	**Fasteners**	
	Bolts used structurally shall be metric property class 8.8, 9.8 or 10.9 in accordance with ISO 898-1, or equivalent. Nuts used structurally shall be metric property class 8 or 10 in accordance with ISO 898-2, or equivalent.	Not applicable

8	**Acceptance Criteria**	
8.a	The specific lateral force and lateral energy, vertical load-carrying capacity and the longitudinal force requirements shall be met or exceeded in the testing of a single representative specimen. The equations for determining the values to be met are given in Table 1.	Fulfilled
8.b	The force and energy requirements under lateral loading need not be attainable simultaneously. One may be significantly exceeded before the other is attained. If the force is attained before the energy, the force may decrease but shall again attain the required level when the lateral energy requirement is met or exceeded.	Fulfilled
8.c	No part of the ROPS shall enter the DLV at any time during the lateral, vertical or longitudinal loading phases of the test. The limitations on the deflections are absolute.	Fulfilled
8.d	Except for the situation as described in 8 f), the LSGP, as illustrated in Figure 6, shall not enter the DLV (upright mode) at any time during the lateral loading phase of the test. *LSGP – Lateral simulated ground plane*	Fulfilled
8.e	The VSGP shall not enter the DLV at any time during the vertical loading phase of the test for a rollbar ROPS, or one-post or two-post ROPS (see Figure 16). *VSGP – Vertical simulated ground plane*	Not applicable
8.f	During lateral loading with a side-facing operator seat mounted off the machines longitudinal centreline or for longitudinal loading with the operator facing the direction that the ROPS will deflect under load application, it is permissible for the upper portion of the DLV to be rotated “forward” up to 16° about its seat index point (SIP), as defined in ISO 5353, to prevent intrusion of ROPS members or the LSGP in lateral loading only. Forward rotation of the DLV shall be limited to less than 16° if interference with any machine components or intrusion by controls occurs at a lesser angle.	Not applicable
8.g	If a longitudinal load is applied in the direction opposite to that indicated in 8.1 f (i.e., with the operator facing the direction opposite that which the ROPS will deflect towards under load application), no rotation of the DLV is allowed. The force requirement shall be attained within the same conditions as required to achieve the lateral energy requirement.	Not applicable
8.h	The ROPS shall not break away from the machine frame due to separation of the ROPS, its mounting system, or the machine frame. In the event of a partial separation, the ROPS must demonstrate the capability of preventing total separation from the machine at the required force and energy levels.	Fulfilled

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9	**Labelling of ROPS**	
9.2	**Label Specification**	
	The label shall be of a permanent type and permanently attached to the structure.	Fulfilled
	The label shall be located on the structure so that it can be easily read and is protected from weather defacing.	Fulfilled
9.3	**Label Content** The label shall indicate the following:	
a.	the business name and full address of the ROPS manufacturer, and, where applicable, his authorized representative;	Fulfilled
b.	designation of the ROPS, if any	-
c.	mandatory marking, if applicable	Fulfilled
d.	designation of series or type/model of machine for which the ROPS is intended	Not applicable
e.	serial number, if any	Not applicable
f.	year of construction, i.e. year in which the manufacturing process was completed	Not applicable
g.	maximum machine mass, *m*, for which the ROPS structure meets all of the performance requirements of this International Standard;	Not applicable
h.	International Standard number(s) for which the structure meets all of the performance requirements;	Fulfilled
i.	other such information as is deemed appropriate (e.g.installation, repair or replacement information).	Not applicable

A.2 IDENTIFICATION

A.2.1 Machine

Type	SKID STEER LOADER M60 CAB
Manufacturer	ALPIN MAKINE SAN.VE TIC. A.Ş. 29 Ekim Mah. İzmir-Aydın Karayolu No:7 Yazıbaşı Mevki Torbalı İZMİR - TÜRKİYE
Model number	M60(M49 may be for the future)
Serial number	Not applicable
Machine frame part number	Not applicable
Category of vehicle	SKID STEER LOADER

A.2.2 ROPS

Manufacturer	ALPIN MAKINE SAN.VE TIC. A.Ş. 29 Ekim Mah. İzmir-Aydın Karayolu No:7 Yazıbaşı Mevki Torbalı İZMİR - TÜRKİYE
Model	M60(M49)
Serial number	Not applicable
ROPS part number	PRTM60T2

A.3 INFORMATION SUPPLIED BY MANUFACTURER

Maximum recommended mass	3250 kg
Location of DLV (SIP Points)	See Annex 1
Date of issue of information folder	06.11.2020

A.4 CRITERIA

Lateral load force	19.500 N
Lateral load energy	3067,4 J
Vertical load force	63732,5 N
Longitudinal load force	15.600 N

A.5 TEST RESULTS

The following force and energy levels were achieved or exceeded with no penetration by the ROPS structural member or the SGP (where applicable) into the DLV.

A.5.1 Lateral loading

Maximum force attained after the energy requirement was achieved or exceeded	**19.701,4 N**
Absorbed energy attained	**3.158,28 J**

A.5.2 Vertical loading

Maximum force attained	**64.395,42 N**

A.5.3 Longitudinal loading

Maximum force attained	**15.722,28 N**

A.5.4 Temperature and material

The test was performed with ROPS and machine frame members soaked to	Not applicable
The Charpy V-notch impact strength requirements for ROPS structural metallic members were tested on a specimen of size … mm × … mm. The absorbed energy was ... J	See Annex 1
Nut property class	See Annex 1
Bolt property class	See Annex 1

A.5.5 Use of special suspension or shock-absorption system

Manufacturer	Not applicable
Model	Not applicable
Product Identification Number	Not applicable

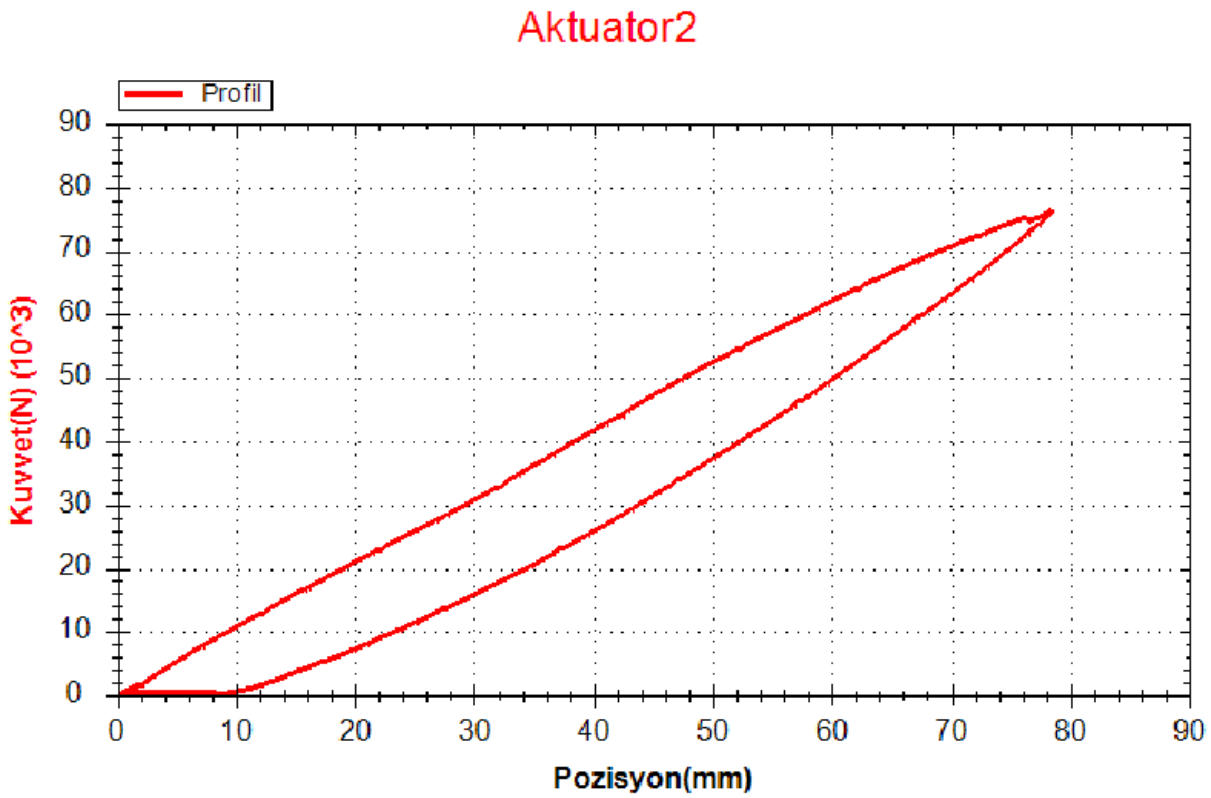
A.5.6 Force-deflection curve for loading test

Lateral loading

Force required	: 19.500 N
Force attained	: 19.701,4 N
Energy required	: 3067,4 J
Energy attained	: 3.158,28 J
Maximum force attained after the energy requirement was achieved	: 76.209,14 N

Deflections

Elastic + plastic	: 78,41 mm
Plastic	: 0,76 mm

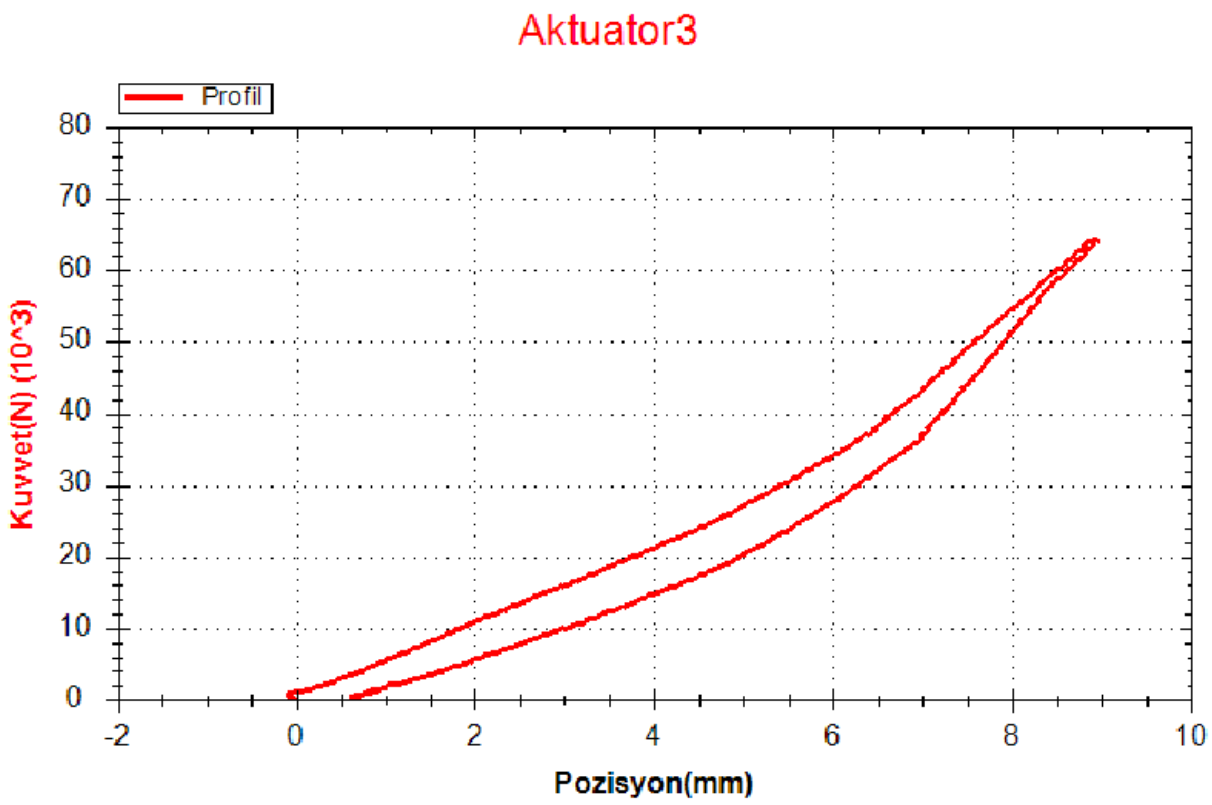


Vertical loading

Force required : 63.732,5 N
Force attained : 64.395,42 N

Deflections

Elastic + plastic : 8,97 mm
Plastic : 0,61 mm

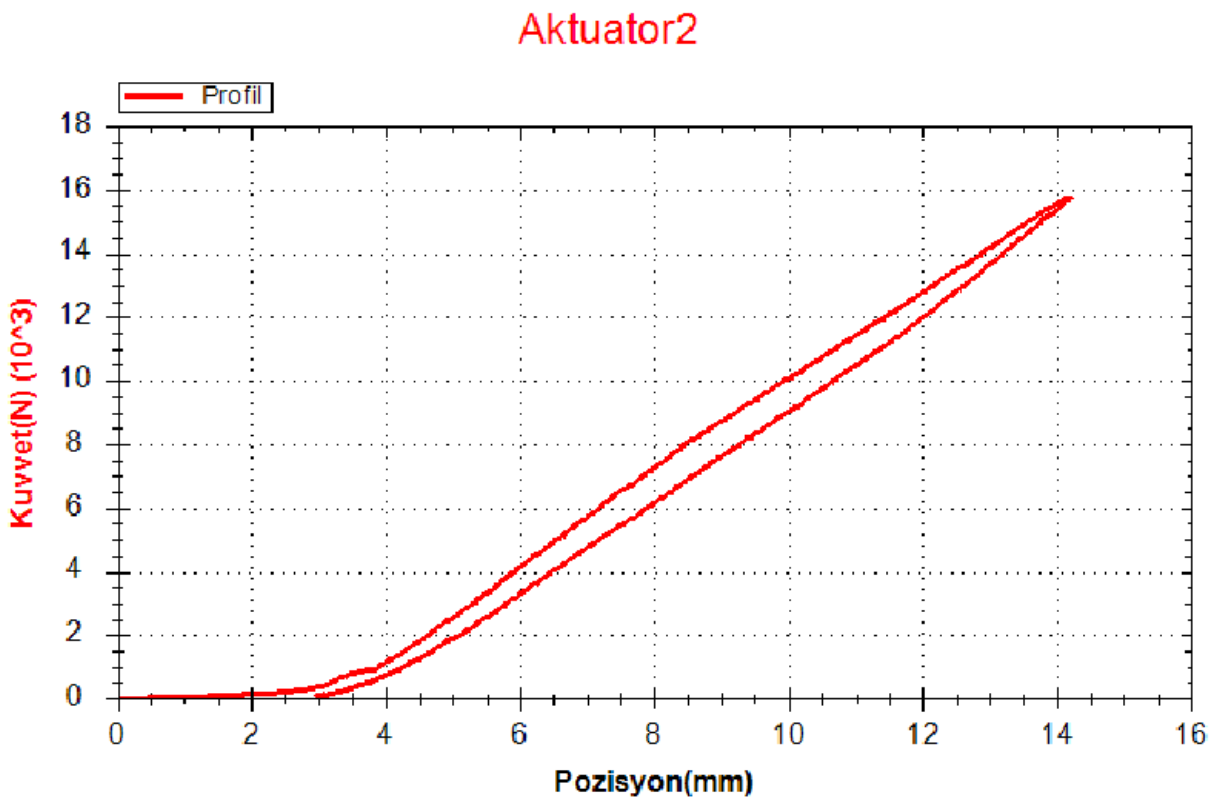


Longitudinal loading

Force required :15.600 N
Force attained :15.722,28 N

Deflections

Elastic + plastic :14,21 mm
Plastic :3,02 mm



A.5.7 Photographs of specimen

Test cabin

Connection to bedpplate

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Location of DLV

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Load application point of lateral loading

Load application point of longitudinal loading

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Load application point of vertical loading

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10. Test place and date

Tüv Austria Türk Test Merkezi

TR / Kocaeli

30.11.2020

11. Final Confirmation

As the result of inspections of **"Alpin Makine San. Ve Tic. A.Ş."** sample product, it has been confirmed that the selected vehicle from the approved information document and this technical report fulfilled the requirements mentioned at the ISO 3471:2008 Earth-moving machinery -Roll-over protective structures- Laboratory tests and performance requirements.

This report can not be multiplied without written approval of TUV AUSTRIA TURK.
This report is not valid without security hologram in this page.
This technical report consists of 19 pages.

TR- Istanbul 15.12.2020	Özlem OK A Check	İsa ÖZKAN Q Check		Abdullah ATEŞ Recognized Expert/Signature

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