TEST REPORT

Mechanical environment test
N° P238103/0001-V4 – Date of issue : 08/04/2025
Cancels and replaces : P238103/0001-V3

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Applicant reference

Name: **ENGANCHES Y REMOLQUES ARAGON SL**
Address: PI Malpica B Percella 77
50016 ZARAGOZA - ARAGON
SPAIN
Order reference: PC050735
Order date: January 15th, 2024

Performed tests

Mechanical enivronment test

Reference document(s): ISO 11154 : 2023

Date of tests : January 30th 2024

Samples submitted for testing

TOWBOX ALPHA
Trade name in some countries : TOWBOX V5

Details about samples are given in page 2

Test officer

Nathanaël LE BIHAN

1. DESCRIPTION OF SAMPLES SUBMITTED FOR TESTING

LNE reference	Description	Reference	Manufacturer	Receipt date
LNE2024002118	TOWBOX ALPHA	-	ENGANCHES Y REMOLQUES ARAGON SL	01/26/2024

TOWBOX ALPHA (Trade name in some countries : TOWBOX V5**)**
Maker : ENGANCHES Y REMOLQUES ARAGON SL
S/N : RC2021186029
Maximum load : 50 Kg

Figure 1.1 : TOWBOX ALPHA

Figure 1.2 : Identification label

Observations before testing

Nothing to report

2. TESTS PARAMETERS

2.1. BEHAVIOUR TO MECHANICAL SHOCK "CITY CRASH TEST" ACCORDING TO ISO 11154 : 2023 STANDARD

- Shock waveform : trapezoidal
- Peak acceleration : 8 g
- Min pulse duration : 70 ms according to the sequence described below :
  - Increase from 0 to 8 g in 20 ms
  - Step over 8 g longer than 30 ms
  - Decrease from 8 g to 0 g in 20 ms
- Number of shocks : 1
- Test load : 50 kg
- Test axis : longitudinal
- Special conditions :
  - A visual inspection is performed after the test

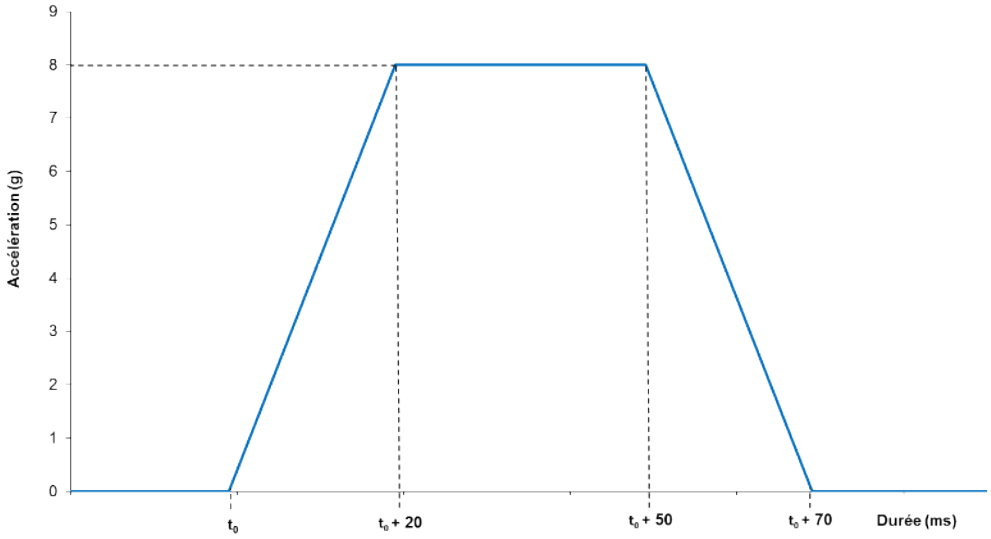


Figure 2.1 : Shock pulse (The shock performed must be above this curve)

3. TESTS PROCEDURES

3.1. CITY CRASH TEST

The tow box (with its test load : 50 kg ballast) is mounted on a car tow ball as described in the user manual.

The a car tow ball is fixed to the test mounting by M10 screws and the test mounting is fixed to the test table by M10 screws and bridles(see photos in appendix 3).

The acceleration measurement is performed on the test table.

3.2. CHECK AFTER THE TEST

The following points are checked :

- The tow box remains attached to the car tow ball
- No component (over 10 grams) shall be detached during the impact
- Any damage noted during the shock that remains acceptable

4. TEST EQUIPEMENTS

4.1. SHOCK GENERATION

The shock is performed using LANSMONT shock test type HITS, equipped with a pneumatic cylinder on the seismic mass (trapezoidal shock pulse programmer).

4.2. ACCELERATION MEASUREMENT

The accelerometric measurement is carried out using 51FI004 LMS data acquisition system (type SC302VB S/N 42064912), equipped with the ISTAR IP_A software, 51AC060 accelerometer Bruël & Kjær model 4384 SN 31482 and the 51AM026 Bruël & Kjær model Nexus 2692 S/N 2421782 conditioning amplifier.

5. TEST EQUIPMENTS CALIBRATION

5.1. ACCELERATION MEASUREMENT

Equipment	Manufacturer	N°	Controller	Calibration date	Periodicity *(± 3 months)*	Certificate
Data acquisition system	LMS	51FI004	SIEMENS	10/24/2023	24 months	2023-42064912
Accelerometer	Bruël&Kjær	51AC060	LNE	2/22/2022	24 months	IN103284/4
Conditioning amplifier	Bruël&Kjær	51AM026				

6. TESTS RESULTS

6.1. ACCELEROMETRIC MEASUREMENT

- Pulse accelerogram shown in appendix 1

Peak acceleration (g)	Pulse duration over 8 g (ms)	Pulse duration (ms)
9.90	48.89	71.81

6.2. VISUAL CHECKS DURING AND AFTER TEST

- No component has been detached during the test
- Visual inspection after the test :
  - Nothing to report
- Photos of test in appendix 3

7. COMMENTS

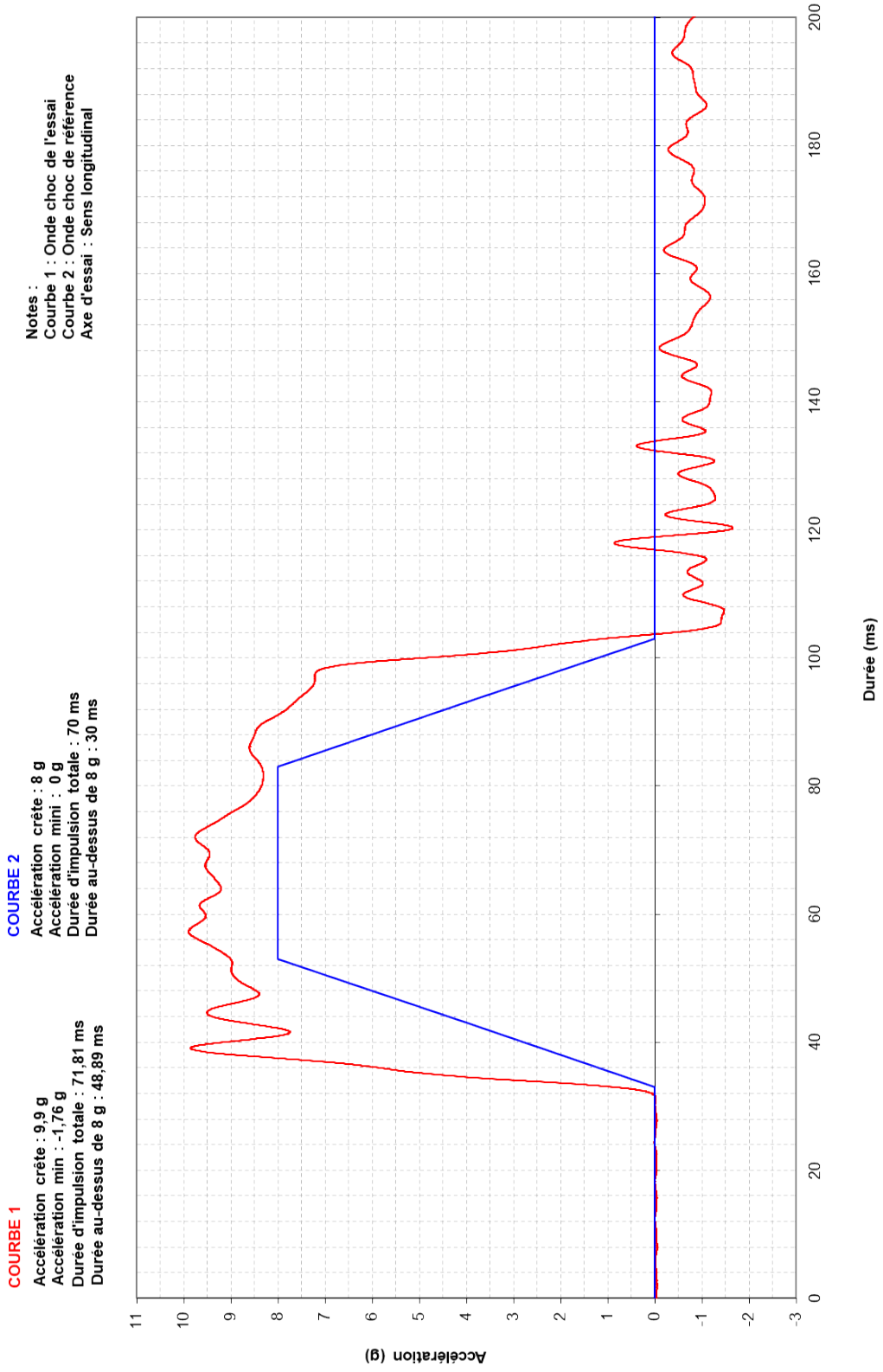
The TOWBOX ALPHA (Trade name in some countries : TOWBOX V5**)** presented is compliant with the ISO 11154:2023 standard « City crash test ».

8. ADDITIONNAL CLAUSES

The results that are quoted are only applicable to the sample, the product or material submitted to LNE and which is fully described in this document.

APPENDIX 1

Pulse accelerogram



APPENDIX 2

TOWBOX ALPHA

APPENDIX 3

TOWBOX ALPHA loaded with 50 kg

City crash test (before the test)

APPENDIX 4

Changes between documents P238103/0001-V3 and P238103/0001-V4

Paragraph	Changes
Page 1 Paragraphs 1 and 7	“TOWBOX 5” replaced by “TOWBOX V5”