TOPTESTER OY

TEST REPORT

“MIL-STD-810H, METHOD 516.8 SHOCK, PROCEDURE I”

Customer:	Niko Peltoniemi
Device name (& version):	Lumonite Compass (V7)

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1. TEST INFORMATION

CUSTOMER:	Handshake Finland Oy
TEST NAME:	MIL-STD 810H, Method 516.8 Shock, Procedure I
TEST DATE:	01.06.2021
TEST SITE(S):	Toptester Laboratory Rovaniemi

EQUIPMENT UNDER TEST

DEVICE NAME:	Lumonite Compass
VERSION NR.:	V7 (2021)
DEVICE ID:	LC000011

Test ID:	Shock_Handshake_Compass_2021-06-01
Report version:	1.1
Class:	Cust

Persons in charge of the test

Customer:	Niko Peltoniemi
Toptester:	Janne Keskiniva
Test ordered by:	Niko Peltoniemi
Test order date:	May 2021

2. TEST REPORT HISTORY

Version	Date	Change description	Changes made by
1.0	02.06.2021	First version of the report is 1.0. If no changes are necessary, it will be also the final version.	Janne Keskiniva
1.1	02.06.2021	Updated the EUT information	Janne Keskiniva

3. CONTENTS

4. TEST SUMMARY

Used standard or test method summary

The test was MIL-STD-810H, Method 516.8 Shock, Procedure I - Functional shock.

Description of equipment under test

Lumonite Compass (V7), Multifunctional High Power Headlamp

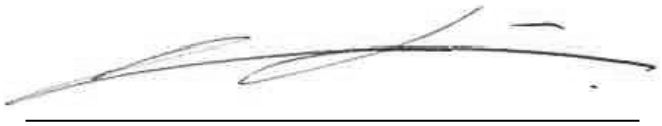
Test result summary

During the shocks, no flickering or interruptions on the light beam were detected.

No visual damage was found.

Test result PASS.

Signatures

Test performed and reported by: 

Date: 02.06.2021 Janne Keskiniva

5. INTRODUCTION

5.1. Background

This test was a part of Equipment Under Test (EUT) R&D phase product reliability testing.

5.2. Equipment under test

Equipment Under Test (EUT) Figure 1:

- Lumonite Compass
  - Version: V7
  - Device ID: LC000011

Figure 1. EUT

5.3. Goals of the test

The goal of the test was to see if the EUT's passed or failed the acceptance criteria.

6. DESCRIPTION OF PRELIMINARY DATA

The earlier version of EUT was tested 28.10.2020. See report document Toptester_TestReport_Shock_Handshake_201028_01

7. TEST METHOD AND MEASUREMENT DESCRIPTION

7.1. Test Method

The test was MIL-STD-810H, Method 516.8 Shock, with following parameters:

Procedure I Functional shock

- Acceleration: 70 g
- Pulse duration: 6 ms
- Pulse shape: Terminal peak sawtooth
- 100 shocks to each 6 directions (+Z, -Z, +Y, -Y, +X, -X)
- Speed: One pulse / 2 sec
- 3pcs of preliminary pulse shape adjustment pulses was performed. With severities of -9dB, -6dB and -3dB from the test pulse

7.2. Acceptance Criteria

EUT's must function during and after the test and survive without damage.

7.3. Analyses

EUT was visually monitored during the test.

A visual inspection of functionality and damage was performed before and after the test and after each completed direction.

7.4. Test Equipment, Reliability Control and Measurement

- Tira Vibration Test System TV 59335/RIT-440
- Tira Power Amplifier A 3 08 3 0 060
- Siemens LMS Scadas Mobile frontend, model SCM202V
- Siemens Simcenter Testlab 18 software
- Calibrated accelerometers
- Measurement PC

Table 1. Used accelerometers.

	Manufacturer	Type	S/N	Last calibrated	Calibration valid until
Control	Kistler	8704B50M1	C129604	10.05.2021	09.11.2022
Reference	PCB	TLD352C04	115591	10.05.2021	09.11.2022

Shaker was controlled with a calibrated accelerometer and the vibration measurement data was stored to Simcenter Testlab 18 files.

The estimated, expanded measurement uncertainty is 5,38 %. This value takes only into account the uncertainties caused from the measurement equipment used in the test, i.e. accelerometer, front-end and possible disturbances in the measurement cables.

7.5. EUT functional Control and Measurement

EUT is a battery powered headlamp. During the test the EUT was functional, the light was lit.

8. TEST PROCESS

Ambient temperature of the laboratory was 20,4°C and ambient humidity 35,5%.

The shaker was installed to its vertical position. An aluminum jig was attached to the shaker. The EUT was installed to aluminum jig built for attaching the EUT and enabled the altering of all the six directions with the shaker's aluminum jig Figure 2.

The control accelerometer was attached (red arrow Figure 2) to the aluminum jig. A verification sensor was attached to the base of the aluminum jig (blue arrow Figure 2).

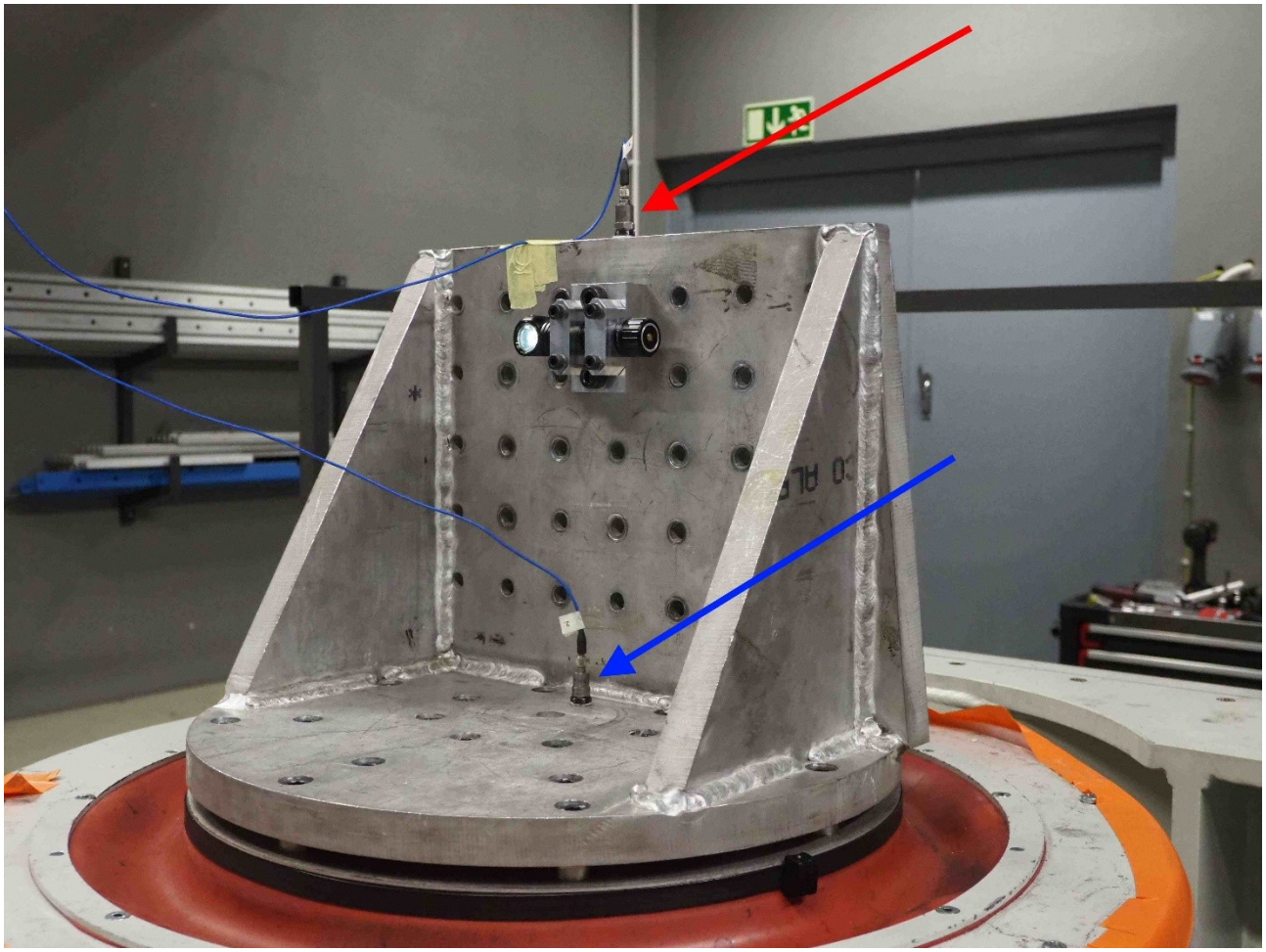


Figure 2. Test setup to X direction.

During the test customer was filming and taking pictures of the test process.

First 100 shocks were performed to +X direction. Figure 2 shows the test setup to X direction. The shock direction is altered via control software.

After positive shocks, the verification sensor was removed and the EUT installed lower on the jig by customer request to get better visual images and video. Setup to the -X direction in Figure 3.

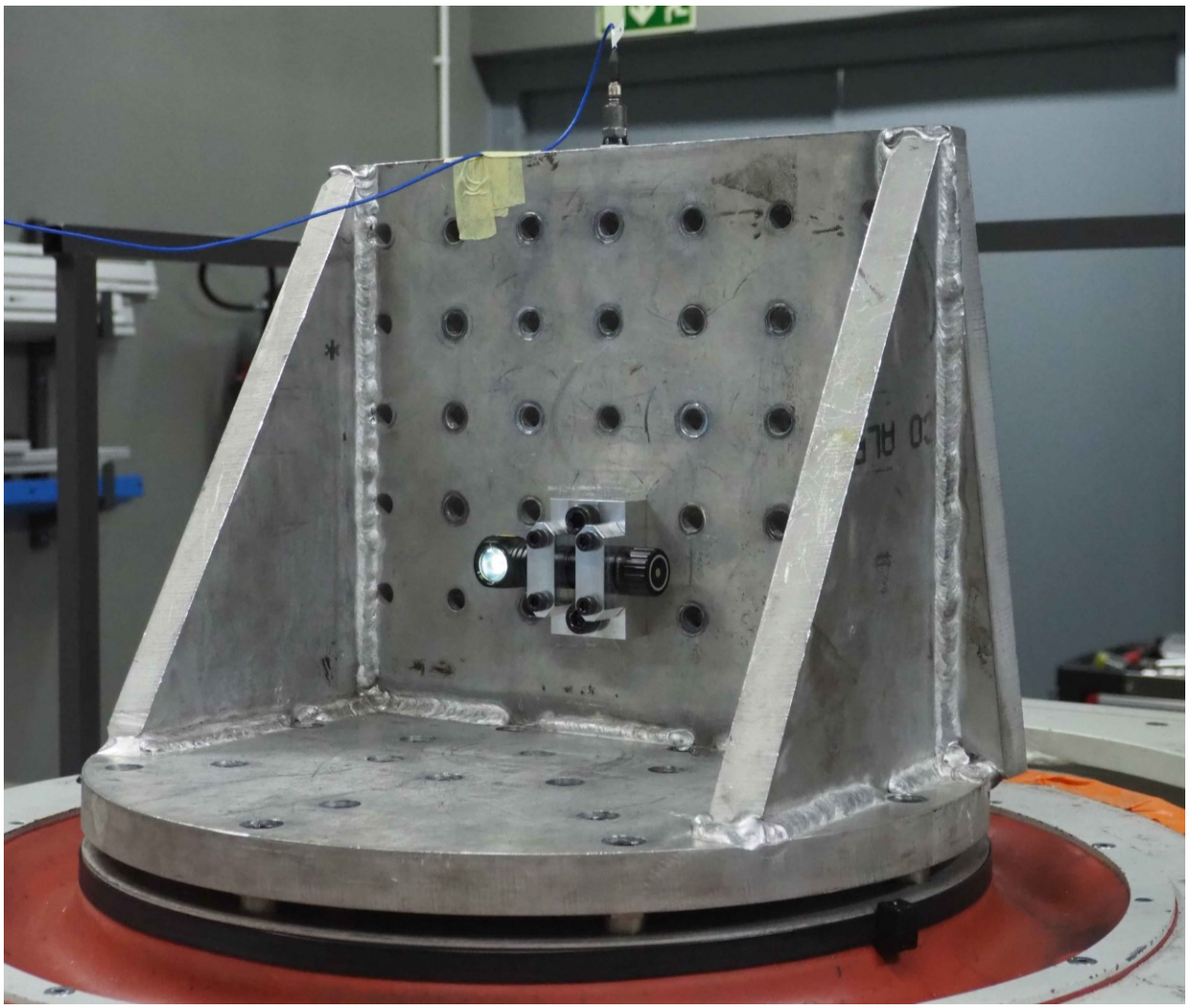


Figure 3. Test setup to -X direction.

After the 100 shocks were performed to negative X direction the EUT was turned 90 degrees along its axis to achieve Y directional test setup (Figure 4).

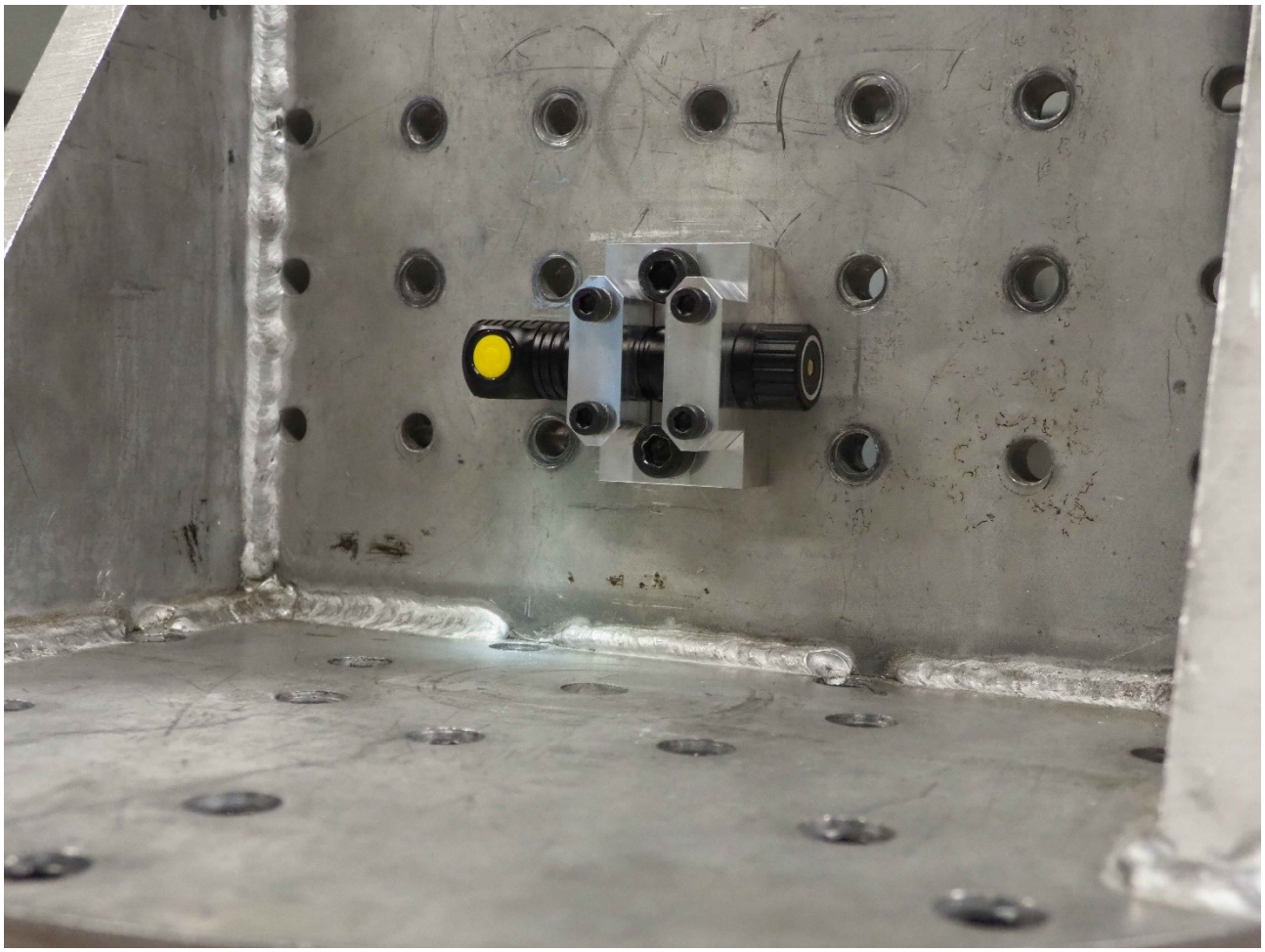


Figure 4. Test setup to Y direction.

100 shocks were performed to positive Y direction and then to negative Y direction.

To achieve Z directional test setup the EUT jig was rotated 90 degrees on the shaker's aluminum jig Figure 5.

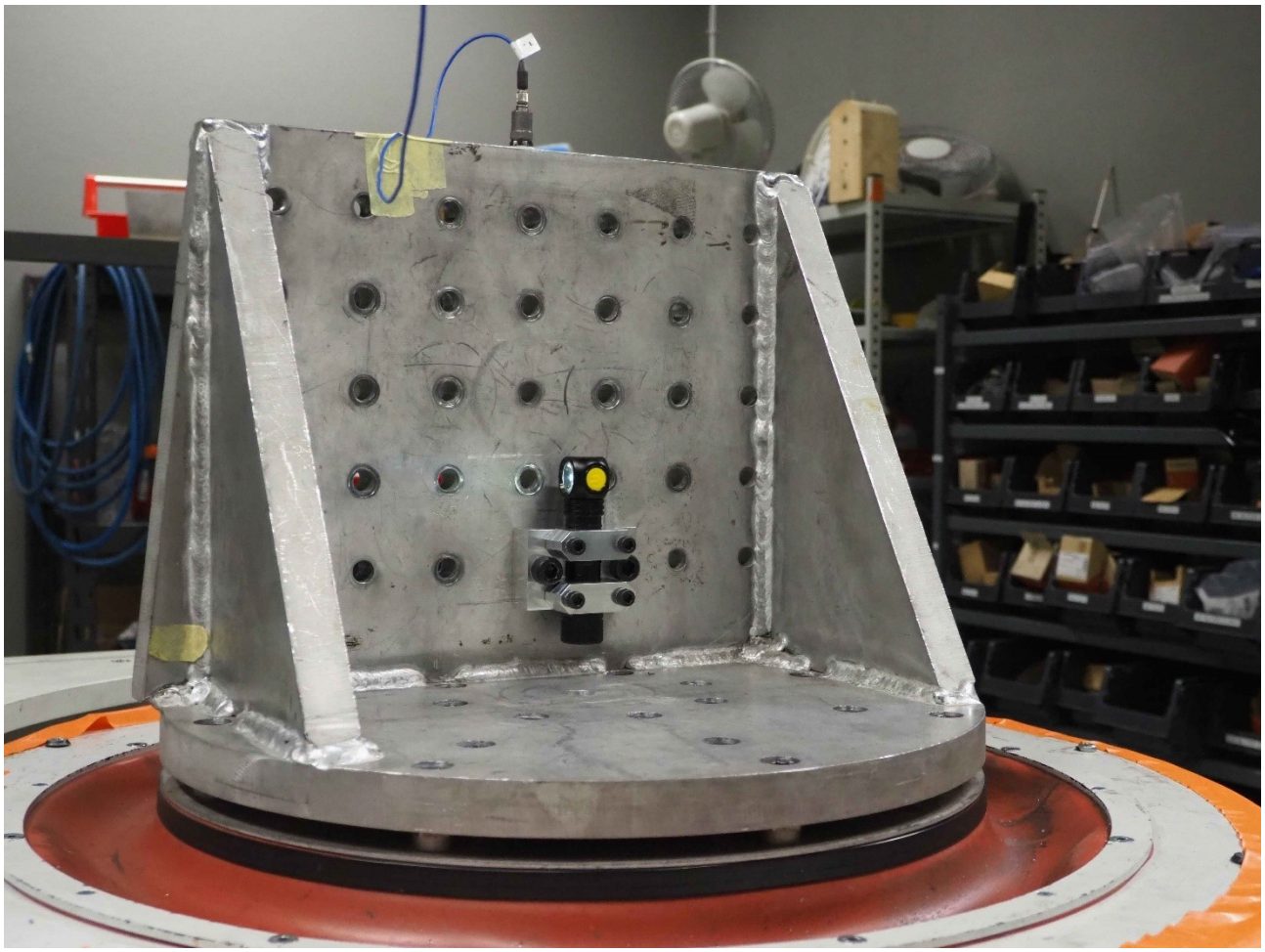


Figure 5. Test setup to Z direction.

100 shocks were performed to positive Z direction and then to negative Z direction.

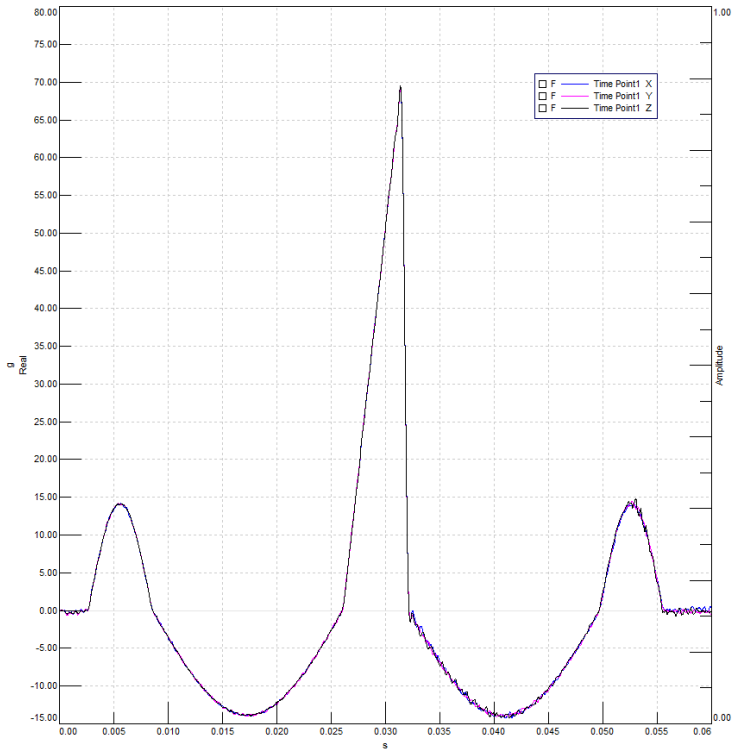


Figure 6. Typical positive 70g shock pulse to X, Y and Z direction.

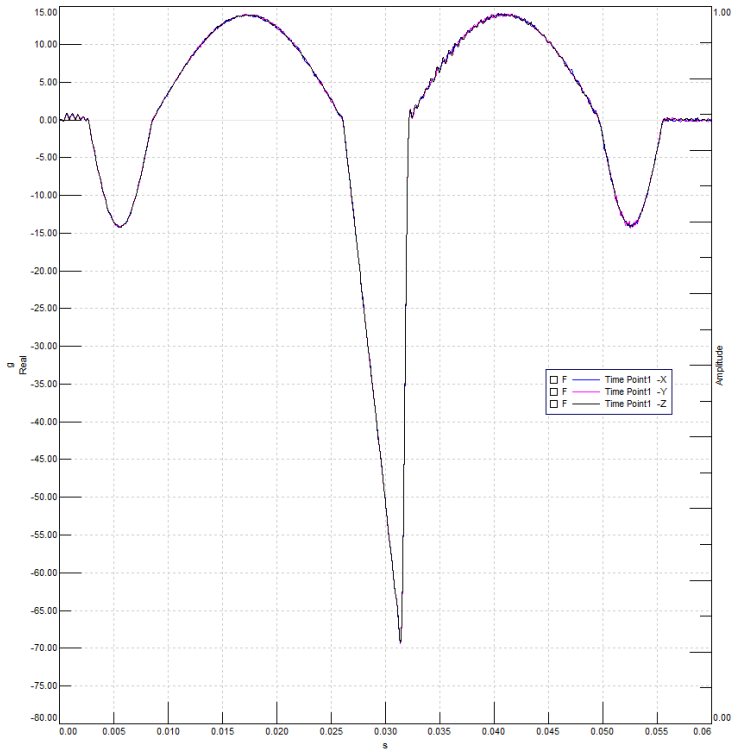


Figure 7. Typical negative 70g shock pulse to X, Y and Z direction.

9. RESULTS AND CONCLUSIONS

During the shocks, no flickering or interruptions on the light beam were detected.

No visual damage was found.

Test result PASS.

10. QUALITY CONTROL

ORGANISATION CERTIFIED BY Inspecta ISO 9001

Toptester is an ISO 9001 certified organisation

FINAS
Finnish Accreditation Service
T275 (EN ISO/IEC 17025)