



# OXFORD

## CLIQR – DEVICE ADAPTORS



VIBRATION TEST REPORT

LAST UPDATED: 22/10/20

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# VIBRATION TEST REPORT

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<b>CUSTOMER</b>	Oxford Products Limited, 2 De Havilland Way, Witney, Oxfordshire. OX29 0YA
<b>ORDER NUMBER</b>	TE1000
<b>TEST DATE(S)</b>	15th October 2020
<b>EQUIPMENT TESTED</b>	CLIQR Device Mounts - Various different designs
<b>SERIAL NUMBER(S)</b>	N/A
<b>TEST ENGINEER</b>	Richard Johnson
<b>TEST WITNESS</b>	Kris Doe

**TEST ARRANGEMENT**

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# TEST EQUIPMENT

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ITEM	TYPE IDENTIFICATION	SERIAL #	CALIBRATION CERTIFICATE #	CALIBRATION DATE
Vibrator	Ling 900 Combo V826LS	533	The vibrator amd amplifier are part of the generating system, calibration of which is achieved by the Control Accelerometer	
Amplifier	Ling DPA 16	204		
Controller	Bruel & Kjaer Laser USB LAS-200	10848686	CMR193213	16.10.2019
Reference Accelerometer	Endevco 213E	RE58	CMR193214	16.10.2019
Control Accelerometer	DJB	6012	ENV2503	20 .02.2020

# TEST SPECIFICATION

Test reference: IEC EN 60068-2-64:2008 Environmental Testing, Part 2-64, Tests-Vibration and Broadband Random. Spectrum A.3 - Equipment in wheeled vehicles - categories 2a and 2b - Equipment mounted to the body

TEST DESCRIPTION	TEST LEVELS	TEST DURATION	TEST AXES
Category 2b Random	5Hz @ $0.15(\text{m/s}^2)^2/\text{Hz}$ 12 - 8Hz @ $0.9 (\text{m/s}^2)^2/\text{Hz}$ 200Hz @ $0.07 (\text{m/s}^2)^2/\text{Hz}$ g(rms) = $6.70 \text{ m/s}^2$	4 Hours	Verticle Axis
Category 2a Random	5Hz @ $0.4(\text{m/s}^2)^2/\text{Hz}$ 12 - 8Hz @ $4 (\text{m/s}^2)^2/\text{Hz}$ 200Hz @ $0.1 (\text{m/s}^2)^2/\text{Hz}$ g(rms) = $11.0 \text{ m/s}^2$	4 Hours	Verticle Axis

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# TEST CONTROL & MEASUREMENT

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- A single control accelerometer was used
- Environmental Conditions: Ambient room temperature
- The test units were mounted and checked by the Oxford Products representative
- A variety of items were installed in the mounts to represent the full spectrum of positions, applications and loadings
- All tests were carried out in the vertical axis to represent the installed condition for the mounts under test
- The mounts were checked regularly for any sign of loosening
- The items installed in the mounts were not tested

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## TYPICALLY INSTALLED EQUIPMENT



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# BACKGROUND TO THE TESTS

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Oxford Products have been evaluating their CLIQR mounting products with a large number of empirical tests in both the world of cycling and motorcycling. Units have also been field tested over many months and many thousands of miles with no apparent failure.

Laboratory based exposure to random vibration spectra was seen as a way to build on the previous testing, and also, because it allowed the monitoring of a variety of fixturing methods (bolts/clamps/brackets/cable ties etc) to be carried out simultaneously and with identical exposure to vibration forces.

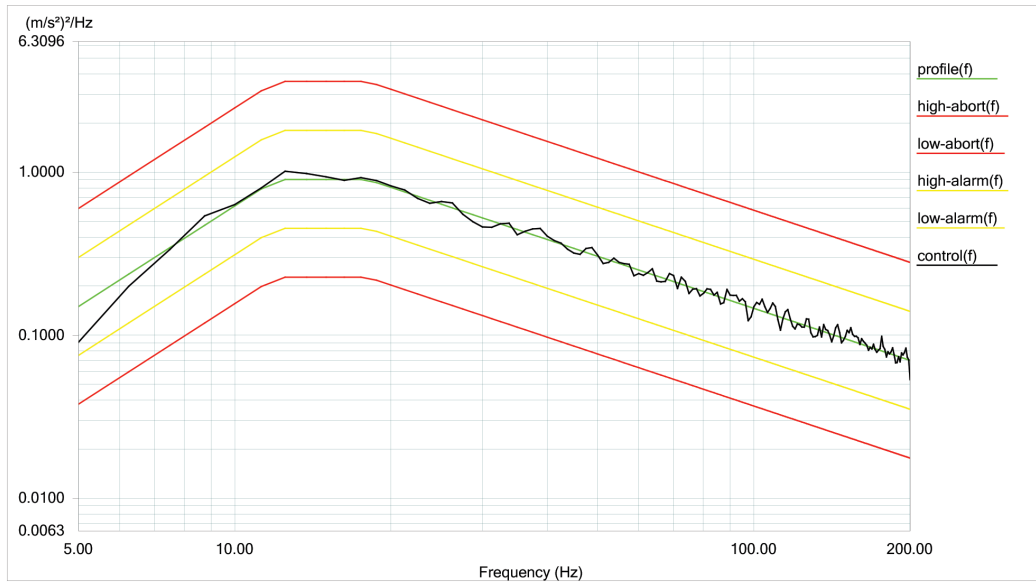
A range of CLIQR mounts were attached to a set of handlebars, which in turn were mounted to the electromagnetic shaker. A variety of equipment was installed in the mounts in a range of orientations and locations on the bars.

The tests were to start with vibration profile from IEC EN 60068-2-64:2008 Environmental Testing, which would allow an accelerated representation of exposure to the typical vibration experienced by body mounted equipment on wheeled vehicles. Following 4 hours of exposure (approximately half that recommended in the standard), the intention was to check the mounts, then increased the severity of the vibration profile to a much higher level for the following 4 hours provided there were no signs of failure.

# TEST RESULTS

The following graphs detail the exposure of the test samples to the vibration levels detailed in the Test Specification section.

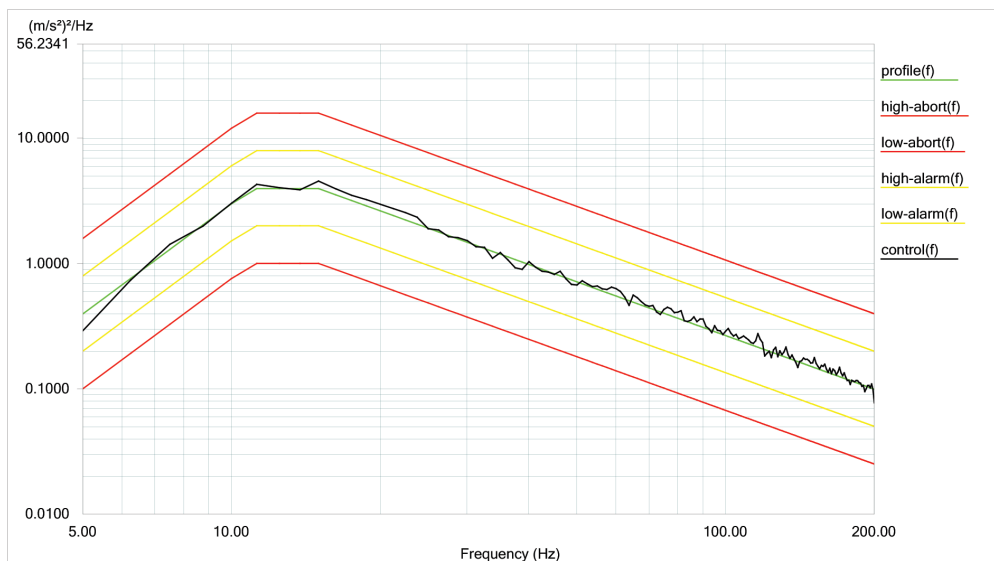
DUT: Oxprod test 2b  
 Serial Number:  
 Project File Name: Long life test.prj  
 Profile Name: MI Level 2      Test Type: Random      Run Folder:



Level: 0 dB  
 Control RMS: 6.775991 m/s<sup>2</sup>      Full Level Elapsed Time: 04:01:25      Lines: 200  
 Demand RMS: 6.705209 m/s<sup>2</sup>      DOF: 154      dF: 1.250000 Hz

Report created at 01:11:37 PM, Thursday, October 15, 2020

DUT: Oxprod test 2a  
 Serial Number:  
 Project File Name: Long life test.prj  
 Profile Name: MI Level 2      Test Type: Random      Run Folder:



Level: 0 dB  
 Control RMS: 11.247248 m/s<sup>2</sup>      Full Level Elapsed Time: 04:02:31      Lines: 200  
 Demand RMS: 10.990476 m/s<sup>2</sup>      DOF: 154      dF: 1.250000 Hz

Report created at 05:34:47 PM, Thursday, October 15, 2020

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## RESULTS - DISCUSSION

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After the initial 4c hour Category 2b tests there were no failures or signs of any of the mounts loosening, so the decision was taken to increase the vibration exposure for the second 4 hour session.

An examination of the mounts following the second 4 hour Category 2a vibration similarly showed no sign of any distress or loosening in the mounts.

Extensive video footage of the vibration tests was taken, and has been provided to Oxford Products.

Whilst there is no guidance from either the motorcycle or cycling industrial trade bodies on what level of exposure is necessary for product qualification purposes, the categories chosen for these tests would be accepted by the motor vehicle sector for equipment mounted to the body of the vehicle.

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## CONCLUSIONS

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By any measure this was an aggressive test for these mounts, and their resistance to a total of 8 hours of vibration at levels far in excess of those that would be experienced in use is an extremely positive outcome.

Provided the mounts are undamaged, attached correctly, and the devices to be mounted are correctly installed (particularly with regard to the self-adhesive mount), then in our opinion the tests demonstrate that the product should perform correctly in service for a minimum of 400 hours of road use. At an average speed of 60mph, this would equate to approximately 24,000 miles of normal service on typical UK roads.