KEMENTERIAN SUMBER MANUSIA

NIOSH
National Institute of Occupational Safety and Health

FALL PROTECTION EQUIPMENT TESTING REPORT

FOR

PTH SAFETY EQUIPMENT SDN. BHD

No. FPETL: 03 – 14C / 02 / 2024 / 038

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DATE	5 JUNE 2024	10 JUNE 2024	10 JUNE 2024

Table of Contents

1.0 INTRODUCTION

1.1 Introduction to Fall Protection Equipment Testing Laboratory (FPETL), NIOSH

Under the Eleventh Malaysia Plan (11th MP), NIOSH Malaysia was given the responsibility to develop a testing laboratory to be used to test and ensure fall protection equipment used by workers in Malaysia is accordance with relevant standards such as BS EN for International and MS for Malaysia. Hence, Fall Protection Equipment Testing Laboratory (FPETL) construction and renovation started on 3rd June 2017 and was officially established on October 2018. To ensure the competency of related NIOSH Malaysia personnel who will be operating the FPETL, training was conducted from 25 to 27 September 2017 in collaboration with Korea Occupational Safety & Health Agency (KOSHA) at their testing facilities in Ulsan, Republic of Korea.

FPETL was **accredited** with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017) (No: SAMM 412) since 2021 under the Laboratory Accreditation Scheme of Malaysia from Department of Standards Malaysia with the Scope of Testing for MECHANICAL. This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017). This laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

There are two Approved Signatories for the laboratory:

1) Muhammad Hairul Farique bin Mohd Fuadi; and
2) Tc. Mohd Fadzli bin Ismail.

The laboratory also has 3 competent persons as Personal Protective Equipment (PPE) Verifier & Inspector:

1) Ts. Hj. Mohd. Esa bin Hj. Baruji (SG1 000426);
2) Muhammad Hairul Farique bin Mohd Fuadi (SG1 000428); and
3) Tc. Mohd Fadzli bin Ismail (SG1 000427).

FPETL provides three types of testing such as 1) Static Strength Test, 2) Dynamic Performance Test, and 3) Conditioning Test to assess and ensure all fall protection equipment and component i.e. full body harness, energy absorber, lanyard and connector comply with a particular standard.

1.2 Objective

The objective of this testing are to test the fall protection equipment conformance to:

i. BS EN 361:2002 - Personal Protective Equipment Against Falls From a Height – Full Body Harness;
ii. BS EN 362:2004 - Personal Protective Equipment Against Falls From a Height – Connectors;
iii. BS EN 354:2002 - Personal Protective Equipment Against Falls From a Height – Lanyards; and
iv. BS EN 355:2002 - Personal Protective Equipment Against Falls From a Height – Energy Absorbers.

2.0 LIST OF EQUIPMENT

I. Load cell with indicator
II. Monorail crane hoist
III. Rigid mass 100 kg
IV. Torso dummy 100 kg

3.0 TEST METHOD

Table 1: Test Method Criteria

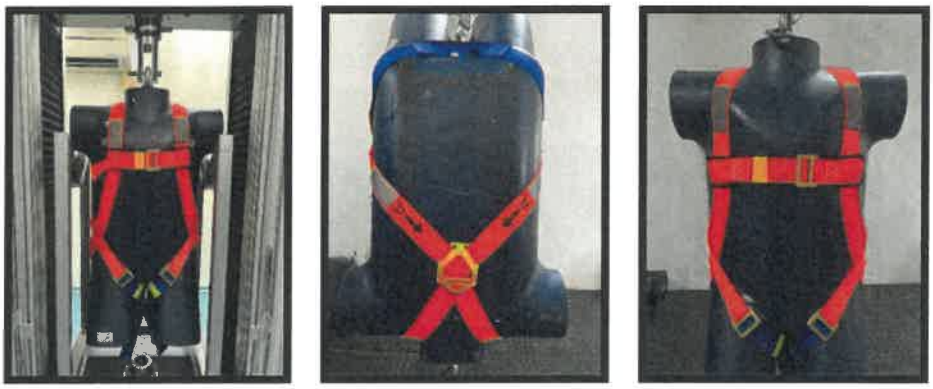
Component	Category	Method	Criteria
Full Body Harness	Dynamic Performance Test	(Drop Test) 1. Free Fall 4 m, 2. Feet First, 3. Head First.	1. Shall withstand two successive drop tests. 2. < 50° axis on dorsal plane and torso dummy.
	Static Strength Test	1. Upper Ring (10 kN), 2. Lower Ring (15 kN).	1. The full body harness shall not release torso dummy.
Energy Absorber	Dynamic Performance Test	(Drop Test) 1. Free Fall 4 m.	1. Braking force shall not exceed 6 kN. 2. Arrest distance, H shall be $H<2L_1+1.75$ m.
Lanyard	Static Strength Test	UTM 1. Tensile Test	1. The lanyard element shall not separate, tear or rupture.
Connector	Class A 1. Static Strength Test 2. Gate Face Test 3. Gate Side Test Class B 1. Static Strength Test	UTM 1. Tensile test, 2. Compression Test.	1. The gate shall still be closed. 2. The gate-locking feature shall still function correctly. 3. The connector shall withstand the force without any partial fracture and gate feature shall still function correctly.

4.0 RESULTS

4.1. Summary of the testing result.

This section is to summarize the result of the testing based on the test method.

Table 2: Testing for dynamic performance and static strength.

1. FULL BODY HARNESS (BACK ATTACHEMENT)		
		
Type of testing	**Product Model/ Serial No.**	**Results**
Static Strength Test	HT 08	According BS EN 361, the full body harness shall not release the torso dummy. After tested, with lower ring and upper ring of torso dummy; i. The full body harness was not released from torso dummy.
Dynamic Performance Test	HT 08	According BS EN 361, the full body harness shall not release the torso dummy and dorsal plane shall be a maximum of 50°. After tested, with feet first and head first of torso dummy: i. The full body harness was not released from torso dummy; and ii. Dorsal plane was not exceeded 50°.

2. CONNECTOR (CLASS A)		
		
Type of testing	**Product Model/ Serial No.**	**Results**
Static Strength Test	HT 04	According BS EN 362 Clause 4.2, the gate shall still close. After tested with a force of 20 kN for a period 3 minutes, the gate still function correctly.
Gate Face Test	HT 04	According BS EN 362 Clause 4.4.1, the gate-locking feature of connectors shall still function correctly. After tested, the gate-locking still function correctly.
Gate Side Test	HT 04	According BS EN 362 Clause 4.4.2, the gate-locking feature of connectors shall still function correctly. After tested, the gate-locking still function correctly.
3. CONNECTOR (CLASS B)		
		
Type of testing	**Product Model/ Serial No.**	**Results**
Static Strength Test	OSPREY	According BS EN 362 Clause 4.2, the gate shall still close. After tested with a force of 22 kN for a period 3 minutes, the gate still closed.

4. ENERGY ABSORBER INTEGRAL WITH LANYARD		
		
Type of testing	**Product Model/ Serial No.**	**Results**
Static Preloading Test	HT 02K	According BS EN 355 Clause 4.3, the permanent extension caused by activation of energy absorber shall not exceed 50 mm. After tested with a force of 2 kN, the permanent extension of energy absorber not greater than 50 mm. Before test: 310 mm After test: 320 mm Extension : 10 mm
Dynamic Performance Test	HT 02K	According to BS EN 355, the braking force, F_{max} should not exceed 6000 N and the arrest distance H shall be $H < 2L_t + 1.75$ m. After tested, the braking force and arrest distance were: F_{max}: 7967.06 N L_t: 2000 mm H: 4275 mm, which was $H < 5750$ mm
Static Strength Test	HT 02K	According BS EN 355 Clause 4.5, the fully developed energy absorber shall withstand a force of 15 kN without tearing or rupture. After tested, the fully developed energy absorber still withstand a force of 15 kN without tearing or rupture.

5. LANYARD		
		
Type of testing	**Product Model/ Serial No.**	**Results**
Static Strength Test	HT 09	According BS EN 354 Clause 4.5.1, the lanyard made from textile material shall sustain a force of at least 22 kN for a period 3 minutes without tearing or rupture of any element. After tested, the lanyard still sustains a force at least 22 kN without separating, tearing or rupture of any element.

Please refer to Dynamic Performance Test (Ref. No.: FBHD – 1, EAD – 1) and Static Strength Test (Ref. No.: FBHS – 1, 2, CTRS-1, 2, 3 & 4, EAP – 1, EAS – 1 & 2, LYDS-1) for the actual reading of the test. The summary of the result is stated in the Certificate of Testing (CoT) (FPETL No.: 03-14C/02/2024/038).

5.0 REFERENCES

5.1. BS EN 354:2002 Personal Protective Equipment Against Falls From a Height – Lanyard;

5.2. BS EN 355:2002 Personal Protective Equipment Against Falls From a Height – Energy Absorbers;

5.3. BS EN 360:2002 Personal Protective Equipment Against Falls From a Height – Retractable Type Fall Arrester;

5.4. BS EN 361:2002 Personal Protective Equipment Against Falls From a Height – Full Body Harnesses;

5.5. BS EN 362:2004 Personal Protective Equipment Against Falls From a Height – Connector; and

5.6. BS EN 364:1963 Personal Protective Equipment Against Falls From a Height – Test methods.

6.0 APPENDIX