



Test Report



Report No	289/7574031	This Report consists of 12 pages
Client	Cameron Design The Studio 1 Prescott Close Northampton NN3 5HZ United Kingdom	
Authority & date	BSI Quotation BSI 0000277279 dated 23 August 2010	
Items tested	Protection against unintended car movement (UCMP) means comprising Model VG Digital Bi-Directional Governor used in conjunction with VG Safety Gears and VG Rope Brake (inclusion of self-monitoring)	
Specification	Type Examination- BS EN 81-1:1998+A3:2009 Safety rules for the construction and installation of lifts- Part 1: Electric lifts Clause 9.11 and Annex F.8 only	
Results	See Text.	
Prepared by	N Shipley 	Certification Technical Manager
Authorized by	J S Dhesi 	Certification Technical Manager
Issue Date	12 May 2011	
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of PS082 'General conditions relating to acceptance of testing'. The results contained herein apply only to the particular sample/s tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the Director, BSI Healthcare & Testing Services, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.	

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CLAUSE 9.11 AND ANNEX F.8 PROTECTION AGAINST UNINTENDED CAR MOVEMENT**

Client's Name:	Cameron Design The Studio 1 Prescott Close Northampton NN3 5HZ United Kingdom
Manufacturer's Name:	Atwell International Limited Ball Mill Top Business Park Hallow Worcester WR2 6PD United Kingdom

Manufacturer's Designation for Protection against unintended car movement	
Testing Commenced:	19 January 2011 and 27 April 2011
Designation of Model:	VG Safety Gears VG-2a, VG-4, VG-5 or VG-6; VG Rope Brake and VG overspeed governor
Minimum / Maximum empty car mass range (kg):	See NOTE 3
Minimum / Maximum rated load range (kg):	See NOTE 3
Spring designation	See NOTE 3
Manufactured with brake lining reference:	N/A
Braking Force N :	See NOTE 3
Response time of detector (ms):	21
Response time of control circuit (ms):	97 for VG Governor 56 for VG Rope Brake
Response time of stopping element (ms):	64 for VG rope brake 122 for VG safety gear
Highest anticipated speed before deceleration occurs (m/s) ⁽¹⁾ :	1 m/sec
Distance from floor at which detector will be installed(m):	0 to 360 mm
Test Speeds (m/s) ⁽²⁾ :	Maximum 1 m/sec
Self monitoring included (Y/N)	Yes

NOTE 1 The maximum speed attainable would normally be in the magnitude of 2m/s. This is based on the speed attained at start of deceleration e.g. being the result of a "natural" acceleration of 1.5 m/s² through the response times of the Unintended car movement protection device, control circuit and stopping elements.

NOTE 2 Test speed(s): a speed stated by the manufacturer, used by the test laboratory to establish a distance moved by the lift (verification distance) so that the unintended movement system is verified for correct operation during final inspection at site. This could be the inspection speed or any other speed determined by the manufacturer and agreed by the laboratory.

NOTE 3 Technical specification dealing rated masses, breaking forces and spring designation is covered by the existing BSI issued EC Type Examination certificates BSI-LP-72024 (VG Rope Break), BSI-LP-73498 (VG-2a), BSI-LP-74399 (VG-4), BSI-LP-74400 (VG-5) and BSI- LP-74401 (VG-6)

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Section 1- Introduction

This Report details the results of the type testing conducted on a Protection against unintended car movement (UCMP) system comprising a VG digital governor used in conjunction with a VG-4 safety gear and a VG Rope Brake to the requirements of BS EN 81-1:1998+A3:2009 Clause 9.11 and Annex F.8 Protection against unintended car movement means. The use of the VG-4 safety gear was used as a representative breaking device from the VG safety gear range comprising of models VG-2a, VG-4, VG-5 and VG-6. To cover the required mass and speed, the appropriate VG safety gear must be used.

The testing was conducted on behalf of Atwell International Limited, Ball Mill Top Business Park, Hallow, Worcester, WR2 6PD, United Kingdom. The testing was witnessed and verified by BSI Engineer, Nathan Shipley and commenced on 19 January 2011 and 27 April 2011.

Section 2- Test Procedure

A test programme was devised and series of tests agreed by the manufacturer and testing laboratory in order to cover the range of speeds and tripping distances associated with Protection against unintended car movement (UCMP) system, the UCMP system has an adjustable setting between 0mm to 320mm so tests were conducted at the maximum 320mm. All testing was conducted on a special test rig (see figure 1) using the VG overspeed governor as a detection means the VG-4 to stop the car in the downwards direction and the VG Rope Brake to stop it in the upwards direction. These were used to represent a configured system using the a combination of the VG-2a, VG-4, VG-5 or VG-6; with the VG Rope Brake as a stopping method.

The manufacturer wished to undertake limited testing and provide calculations in order to prove their system met the requirements of the UCMP under Annex F.8 of EN81-1:1998+A3:2009.

A series of limited testing and submission of calculation by manufacturer were agreed between the manufacturer and testing laboratory to consider coverage of the application range. Also self monitoring and unintended detection movement means where included within the scope of the application and failure introduced to ensure next normal start of the lift shall be prevented.

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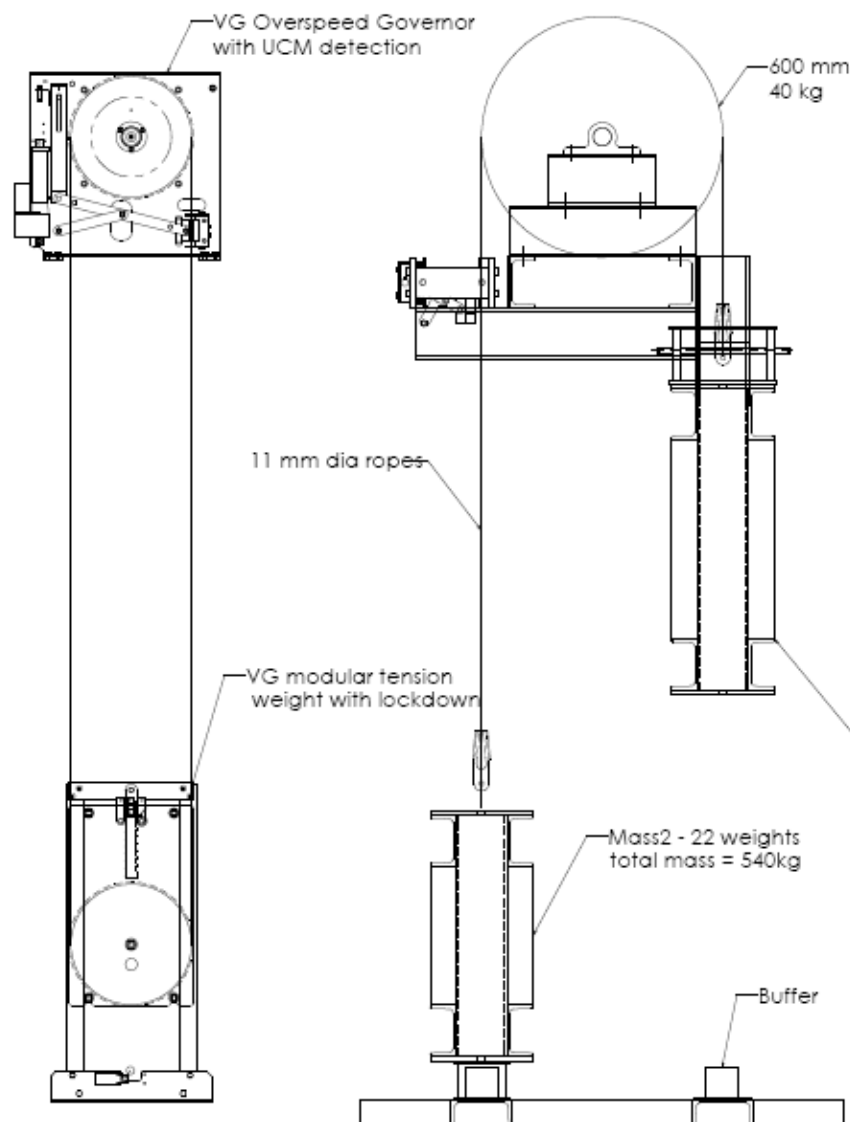
Section 3. Summary

All tests were analysed, the results of which are contained in tabular form in Section 5 and detailed in Section 6 of this Report. The manufacturers' calculations and graphs are provided in Appendix (1) of this Report. Subject to the conditions of test, the brake systems as tested were considered to comply with the requirements of BS EN 81-1:1998+A3:2009 Clause 9.11 and Annex F.8 Protection against unintended car movement means.

The potential variability in, both the items tested and the method of measurement used, means that for measurements close to a specified limit, the level of confidence in a compliance statement may or may not be reduced.

Further advice on the specific measurements in this report that may be affected can be obtained from the report authoriser shown on the front cover.

Figure (1)- Drawing of assembly



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Section 4. Clause 9.11 Protection against unintended car movement

9.11.1 Lifts shall be provided with a means to stop unintended car movement away from the landing with the landing door not in the locked position and the car door not in the closed position, as a result of failure in any single component of the lift machine or drive control system upon which the safe movement of the car depends, except failure of the suspension ropes or chains and the traction sheave or drum or sprockets of the machine.

NOTE A failure of the traction sheave includes a loss of traction.

9.11.2 The means shall detect unintended movement of the car, shall cause the car to stop, and keep it Stopped.

9.11.3 The means shall be capable of performing as required without assistance from any lift component that, during normal operation, controls the speed or retardation, stops the car or keeps it stopped, unless there is built-in redundancy and correct operation is self-monitored.

In the case of using the machine brake, self-monitoring could include verification of correct lifting or dropping of the mechanism or verification of braking force. If a failure is detected, next normal start of the lift shall be prevented.

Self-monitoring is subject to type examination.

Comment: Complies - *The system is capable of performing as required without assistance from any lift component.*

9.11.4 The stopping element of the means shall act:

- a) on the car, or
- b) on the counterweight, or
- c) on the rope system (suspension or compensating), or
- d) on the traction sheave (e.g. on the sheave directly or on the same shaft in the immediate vicinity of the sheave).

The stopping element of the means, or the means keeping the car stopped may be common with those used for:

- preventing overspeed in down direction,
- preventing ascending car overspeed (9.10).

The stopping elements of the means may be different for the down direction and for the up direction.

Comment: Complies - *In the model UCMP tested, the stopping element uses either the VG Safety Gears models VG-2a, VG-4, VG-5 or VG-6 acting on the car in down direction and the VG Rope Brake acting on the rope system for stopping in the up direction.*

9.11.5 The means shall stop the car in a distance:

- not exceeding 1,20 m from the landing where the unintended car movement has been detected, and
- the vertical distance between the landing sill and the lowest part of the car apron shall not exceed 200 mm, and
- the free distance from car sill to landing door lintel, or from landing sill to car door lintel shall not be less than 1,00 m (see Figure 4).

These values shall be obtained with any load in the car, up to 100 % of rated load.

Comment: Complies - *See Section 6.*

9.11.6 During the stopping phase, the stopping element of the means shall not allow a retardation of the car in excess of:

- 1 g_n for unintended movements in up direction,
- the values accepted for safety gears in down direction.

These values shall be obtained with any load in the car, up to 100 % of rated load, moving away from a standstill position at landing level.

Comment: *The stopping element uses existing approved safety components certified under existing BSI issued EC Type Examination certificates BSI-LP-72024 (VG Rope Break), BSI-LP-73498 (VG-2a), BSI-LP-74399 (VG-4), BSI-LP-74400 (VG-5) and BSI-LP-74401 (VG-6).*

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9.11.7 The unintended movement of the car shall be detected by at least one switching device at latest when the car leaves the unlocking zone (7.7.1).

This switching device shall:

- either be a safety contact in conformity with 14.1.2.2, or
- be connected in such a way as to satisfy the requirements for safety circuits in 14.1.2.3, or
- satisfy requirements of 14.1.2.6.

9.11.8 The means shall operate an electric safety device in conformity with 14.1.2 if it is engaged.

NOTE This can be common to switching device of 9.11.7.

Comment: *Manufactures declaration received 13 May 2011.*

9.11.9 When the means has been activated or the self-monitoring has indicated a failure of the stopping element of the means, its release or the reset of the lift shall require the intervention of a competent person.

9.11.10 The release of the means shall not require the access to the car or the counterweight.

9.11.11 After its release, the means shall be in a condition to operate.

Comment: *Manufactures declaration received 13 May 2011.*

9.11.12 If the means requires external energy to operate, the absence of energy shall cause the lift to stop and keep it stopped. This does not apply for guided compressed springs.

Comment: *Complies. The brake operate on solenoid type system thus requires the use of electric otherwise the lift remains stopped.*

9.11.13 The unintended car movement with open doors protection means is regarded as a safety component and shall be verified according to the requirements in F.8.

Comment: *Complies – See Section 5, Section 6 and Appendix (1) of this Report.*

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Section 5. Annex F.8 Unintended car movement protection means

F.8.3 Test

F.8.3.1 Method of Test

The method of test shall be defined between applicant and test laboratory, depending on the device and its function to achieve a realistic operation of the system.

Measurements shall be made of:

- the stopping distance;
- the average retardation;
- the response time of the control circuits;
- the response time of the braking element;
- the total distance travelled (sum of acceleration and stopping distances).

Test shall also include:

- operation of the unintended car movement detection device and
- any automatic monitoring system, if applicable.

Comment: Complies - see test results

F.8.3.2 Test procedure

20 tests shall be made on the stopping element with:

- no result outside the specification,
- each result within $\pm 20\%$ of the average value.

Average value to be stated on the certificate.

Comment: Complies - see test results

F.8.3.2.1 Device certified for a single mass or torque

The laboratory shall carry out ten tests with the system mass or torque representing an empty car in up direction and ten tests with the system mass or torque representing a car carrying the rated load in down direction.

Between each test the friction parts shall be allowed to return to their normal temperature.

During the tests several identical sets of friction parts may be used. However, one set of parts shall be capable of 5 tests minimum.

Comment: Not Applicable

F.8.3.2.2 Device certified for different masses or torques

A series of tests shall be carried out for the maximum value applied for and a series for the minimum value. The applicant shall supply a formula or a chart, showing the calculated variation of the braking force or torque as a function of a given adjustment. The results being expressed in distance travelled.

The laboratory shall verify the validity of the formula or chart.

Comment: The stopping element uses existing approved safety components certified under existing BSI issued EC Type Examination certificates BSI-LP-72024 (VG Rope Break), BSI-LP-73498 (VG-2a), BSI-LP-74399 (VG-4), BSI-LP-74400 (VG-5) and BSI-LP-74401 (VG-6)

F.8.3.2.3 Test procedure for unintended movement detection means

10 tests shall be made to verify the operation of the device.

Comment: Complies - see test results.

F.8.3.2.4 Test procedure for redundancy monitoring

10 tests shall be made to verify the operation of the device.

Comment: Complies - see test results.

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F.8.3.3 Checks after the test

After the test:

- a) the mechanical characteristics of the stopping element(s) shall be compared with the original values quoted by the applicant. Other analyses may be carried out in special cases;
- b) it shall be checked that there are no fractures or deformations or any other changes (for example, cracks, deformations or wear of the gripping elements, appearance of the rubbing surfaces);
- c) if necessary, photographs shall be taken of the gripping elements and the parts on which the device acts for evidence of deformations or fractures.

Comment: Complies - see test results.

F.8.4 Possible modification to the adjustments

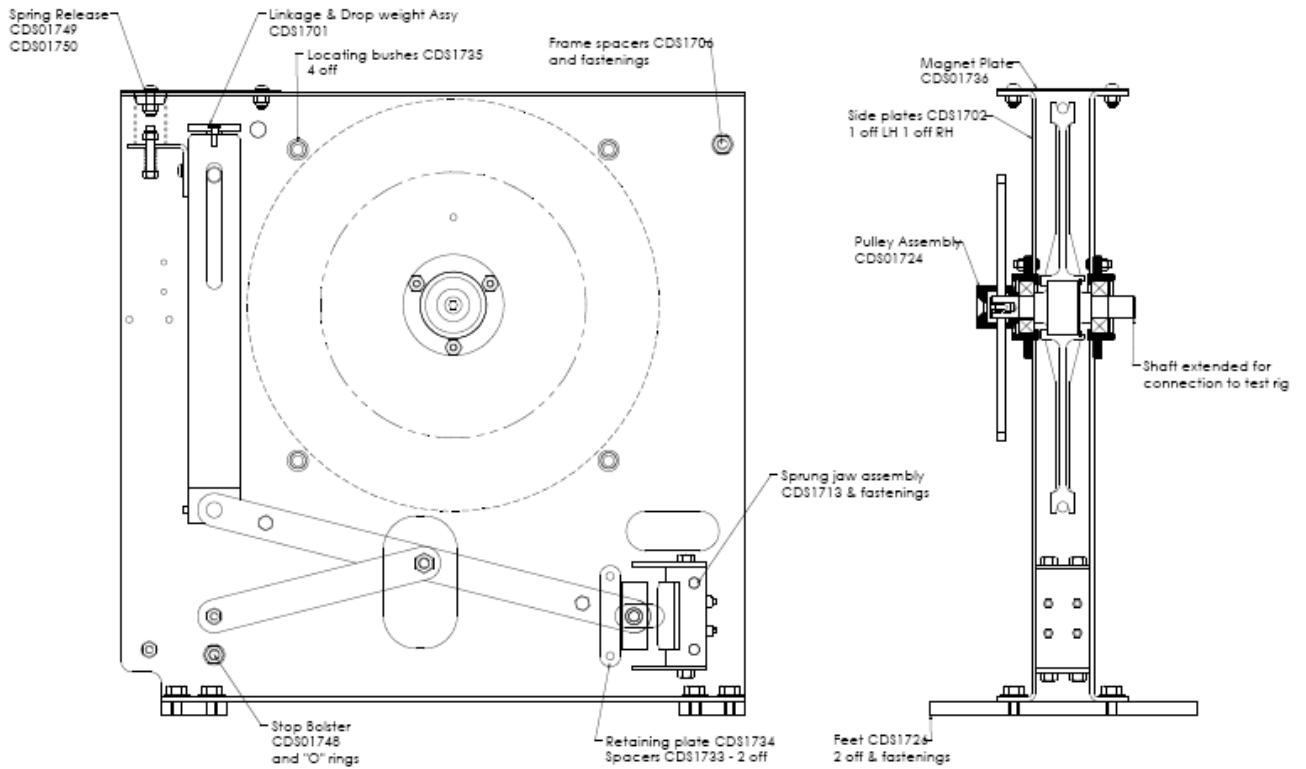
If, during the tests, the values found differ by more than 20% from those expected by the applicant, another series of tests may be made with his agreement, after modification of the adjustments if necessary.

Comment: Complies - see test results, no modifications were made during the test.

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Section 6 – Testing specification and arrangement

Details of monitoring equipment



VG Safety gear specified load

	VG-2a	VG-4	VG-5	VG-6
Min mass (kg)	900	700	850	2000
Max mass @ 1 m/s (kg)	3500	1810	2405	5400
Max mass @ 2 m/s (kg)	3000	1639	2145	4600
Max mass @ 3 m/s (kg)	2550	1477	1900	4000

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Section 6-Test Results

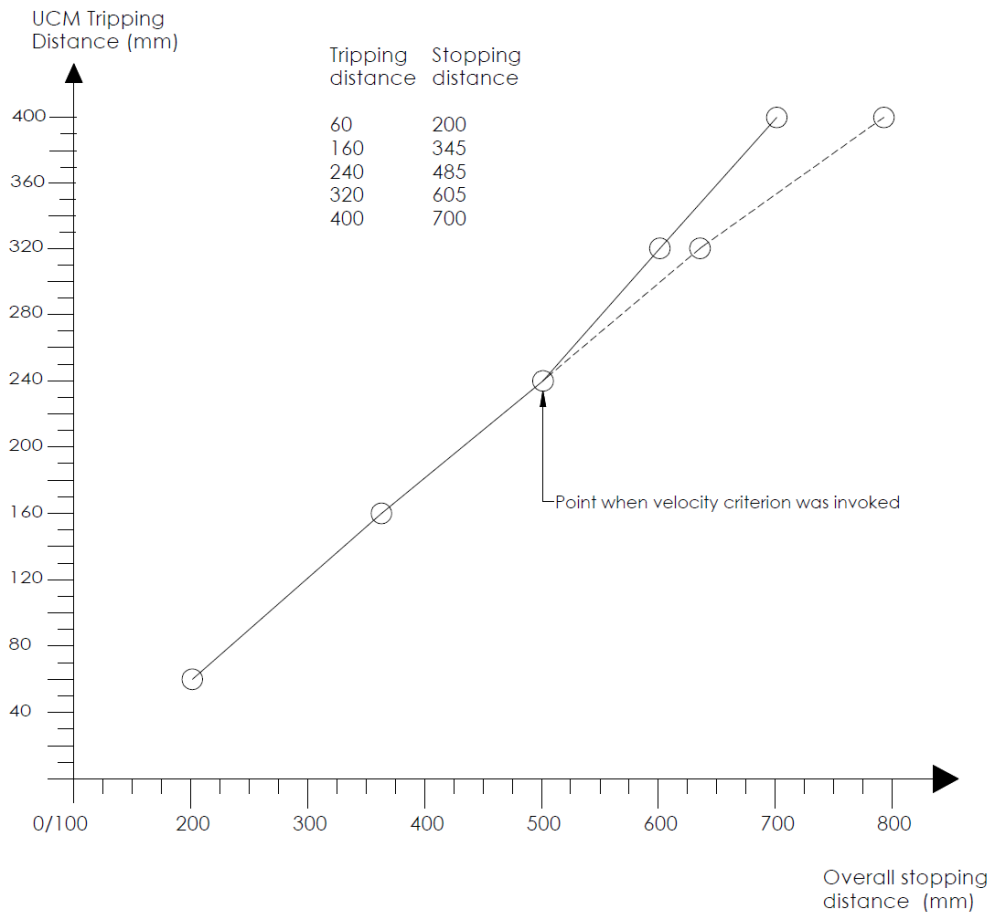
Test No.	Car Weight mass (kg)	Counter-weight mass (kg)	Car Direction		Clause 9.11.6 Car Up Max Deceleration (m/s ²) - results taken from EVA system	Clause 9.11.6 (G) Max. <1g	Clause 9.11.6 Car Down Ave Deceleration (m/s ²) - results taken from EVA system	Clause 9.11.6 (G) Ave. <1g	Max. Speed (m/s)	Clause 9.11.5 Stopping Distance from Origin ≤1.200 m	Clause 9.11.5 Vertical Dis. Landing lowest part of apron ≤ 200mm (Y/N)	Clause 9.11.5 Car sill to landing door lintel or landing sill to car door lintel ≥1.0 m	Response Time of Control Circuits (ms)	Response Time of Braking Elements (ms)	Clause 9.11.3 Self Monitoring failure introduced (Y/N)	Clause 9.11.3 Self Monitoring Failure detected next operation halted? (Y/N)	F.8.3.2.3 Verify operation of UM detection device- OK? (Y/N)	F.8.3.2.4 Verify operation of UM detection Failure detected next operation halted? (Y/N)
1	800	500	Up		0.550	Pass	0.467	-	1.120	524.0	Y	524.0	21.0	118.0	N	-	N	-
2	800	500	Up		0.509	Pass	0.442	-	1.060	494.0	Y	494.0	21.0	118.0	Y	Y	Y	Y
3	800	500	Up		0.503	Pass	0.460	-	1.060	493.0	Y	493.0	21.0	118.0	Y	Y	Y	Y
4	800	500	Up		0.502	Pass	0.454	-	1.080	500.0	Y	500.0	21.0	118.0	Y	Y	Y	Y
5	800	500	Up		0.490	Pass	0.451	-	1.060	488.0	Y	488.0	21.0	118.0	N	-	N	-
				Av.	0.510	Pass	0.455	-	1.076	499.8	-	499.8	21.0	118.0	-	-	-	-
11	800	500	Down		0.671	-	0.476	Pass	1.260	653.0	Y	653.0	21.0	118.0	N	-	N	-
12	800	500	Down		0.651	-	0.479	Pass	1.270	665.0	Y	665.0	21.0	118.0	Y	Y	Y	Y
13	800	500	Down		0.697	-	0.521	Pass	1.280	637.0	Y	637.0	21.0	118.0	Y	Y	Y	Y
14	800	500	Down		0.683	-	0.514	Pass	1.300	650.0	Y	650.0	21.0	118.0	N	-	N	-
15	800	500	Down		0.652	-	0.498	Pass	1.290	652.0	Y	652.0	21.0	118.0	N	-	N	-
				Av.	0.671	-	0.498	Pass	1.280	651.4	-	651.4	21.0	118.0	-	-	-	-
6	800	500	Up		0.474	Pass	0.413	-	4.647	524.0	Y	524.0	21.0	118.0	N	-	N	-
7	800	500	Up		0.456	Pass	0.409	-	4.471	549.0	Y	549.0	21.0	118.0	Y	Y	Y	Y
8	800	500	Up		0.482	Pass	0.417	-	4.731	567.0	Y	567.0	21.0	118.0	Y	Y	Y	Y
9	800	500	Up		0.430	Pass	0.396	-	4.223	516.0	Y	516.0	21.0	118.0	Y	Y	Y	Y
10	800	500	Up		0.465	Pass	0.401	-	4.559	515.0	Y	515.0	21.0	118.0	N	-	N	-
				Av.	0.461	Pass	0.407	-	4.526	534.2	-	534.2	21.0	118.0	-	-	-	-
16	800	500	Down		0.627	-	0.510	Pass	1.280	642.0	Y	642.0	21.0	118.0	Y	Y	Y	Y
17	800	500	Down		0.665	-	0.522	Pass	1.300	647.0	Y	647.0	21.0	118.0	Y	Y	Y	Y
18	800	500	Down		0.691	-	0.495	Pass	1.230	659.0	Y	659.0	21.0	118.0	Y	Y	Y	Y
19	800	500	Down		0.714	-	0.537	Pass	1.270	649.0	Y	649.0	21.0	118.0	N	-	N	-
20	800	500	Down		0.722	-	0.535	Pass	1.330	635.0	Y	635.0	21.0	118.0	N	-	N	-
				Av.	0.684	-	0.520	Pass	1.282	646.4	-	646.4	21.0	118.0	-	-	-	-

Note: Due to configuration of the testing setup a judgement was made in reference to clause 9.11.5 based on stopping distance.

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APPENDIX (1) MANUFACTURER'S CALCULATIONS

UCM & VG ROPE BRAKE TEST RESULTS	<small>FIGURE NUMBER</small> UCM 2
	<small>YEAR</small> <small>ISSUE</small> 2011 1



A series of tests using the VG rope brake and UCM detection control system at different UCM tripping distances. These tests were carried out on the 19th January 2011 and witnessed by BSI.

The UCM control system will trigger if either:-

- a) The tripping distance exceeds a (variable) pre-set distance
- or
- b) the velocity exceeds a (variable) pre-set maximum velocity

For the above series of tests, the preset maximum velocity of 1 m/sec was exceeded at tripping distances greater than 240 mm.

The dotted line indicates the theoretical distance without invoking the maximum velocity criterion.

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APPENDIX (1) MANUFACTURER'S CALCULATIONS (Continued)

