PARTITION PERFORMANCE

OF

AUTOCLAVED LIGHTWEIGHT CONCRETE (ALC)

WALL PANEL

TESTED FOR: GISS Pty Ltd (ACN 125 794 649)
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SUMMARY

TESTED FOR	GISS Pty Ltd
TEST SAMPLE PANEL	Autoclaved Lightweight Concrete (ALC) Wall Panel with thickness of 100mm
TEST DATE	10 Dec 2007 to 31 Dec 2007
TEST METHOD	SS 492 : 2001 & BS 5234 Part 2 : 1992
TEST DESCRIPTION	The purpose of the test is to determine the resistance to damage of partition system for use as internal walls of buildings.

Tests for grade compliance:

a. Stiffness	Load of 500N applied through an area of 150 mm diameter plate perpendicular to the partition surface. 10 mm maximum deflection allowable.
b. Small hard body impact	Impact by a 50 mm diameter / 3 kg steel ball with a swinging arm of 600 mm long swung perpendicularly against the wall. Test on 11 positions (includes a corner). Criteria: no significant damage.
i. Surface damage	Impact energy of 10 Nm (swing angle of 63.6 degree)
ii. Perforation	Impact energy of 30 Nm (swing angle of 131.8 degree)
c. Large soft body impact	Impact by a 50 kg spheroconical bag of 600 mm X 400 mm diameter filled with hardened glass beads. Test on 3 positions (includes a corner). Criteria: no significant damage.
i. Resistance to damage	Impact energy of 100 Nm (drop height of 204 mm). Single impact at two selected positions and one on corner.
ii. Resistance to structural damage	Impact energy of 120 Nm (drop height of 245 mm). Three impacts at two selected positions.
d. Door slam	Partition wall is being slammed a hundred times with a 60 kg door leaf by a force of 15 kg. Door frame shall not be permanently displaced by 1mm.

Other tests:

a. Crowd pressure	A load of 3.0 kN/m is applied through a 2.5 m wooden beam at a height of 1.2 m. No damage or collapse that would render the partition dangerous be allowed.

SUMMARY OF TEST RESULTS:

Summary of strength and robustness tests to SS492 :2001 & BS 5234 : Part 2 : 1992 (Details of partition specimen and test report are attached)				
Tests for grade compliance				
Requirements tested	Grade performance achieved Pass/Fail			
	LD	MD	HD	SD
Stiffness	-	-	-	Passed
Surface damage by small hard body impact : [1] Straight partition Right angle partition	 - -	 - -	 - -	 Tested Tested
Surface damage by large soft body impact: Straight partition Right angle partition	 - -	 - -	 - -	 Passed Passed
Perforation by small hard body impact: [1] Straight partition Right angle partition	 - -	 - -	 - -	 Passed Passed
Resistance to structural damage by large soft body impact	-	-	-	Passed
Door slamming	-		-	Passed

Summary of other tests on partition specimen	
Requirement tested	Performance achieved
Crowd pressure	3.0 kN/m

TABLE OF CONTENTS

1. INTRODUCTION

This document describes the test procedures and reports the performance of partition system.

2. DESCRIPTION OF SAMPLE

The following components information were supplied by GISS Pty Ltd.

Project Name: GISS

Panel Name: Autoclaved Lightweight Concrete (ALC) Wall Panel (without finishing)

Components:

1) Screw used in mock-up of partition wall system : M12 Grad 4.6 bolt

2) Jointing compound (wall) :
- ALC Grout
- AC-810 Sealant
- construction concrete mix

3. TEST STANDARD

BS 5234: 1992 “Partitions (including matching linings)
Part 2: Specification for performance requirements for strength and robustness including methods of test”

4. TEST SETUP

A mock-up test specimen 4.8 m length X 3.0 m height and a partition junction assembly of a right-angle corner with a return of 1.2 m were installed onto the test rig for the performance test.

A total of 2 sheet of attached company’s drawings contain the details of the mock-up specimen.

The test specimen includes a doorset 0.84 m width X 2.16 m height and a 0.59 m run of partition flanking at one side of the doorset.

Figure 1: Full Test specimen mock-up

5. DESCRIPTION OF TESTS

The following tests were conducted:

i. Partition stiffness

ii. Small hard body impact
   a. Surface damage
   b. Perforation

iii. Large soft body impact
   a. Resistance to surface damage
   b. Resistance to structural damage

iv. Door slam

v. Crowd pressure

5.1 Partition stiffness

This test is to establish the ability of the partition to withstand people or ladder leaning against the partition wall without causing unacceptable cracking or movement.

A static horizontal load of 500 N was applied through a 150 mm diameter steel plate with a contact rubber pad of 6 mm thick. The load was applied to the partition at a height of 1500 mm from the bottom of the setup. Deflection was taken on the load side at 125 mm above the centre point of load application. A pretest load of 100 N was applied and stabilised for 1 min before unloading. The load was then applied in steps of 100 N until 500 N before unloading. Each loading was maintained for about 2 minutes for stabilisation.

Deflection was taken at the end of the 2 minutes interval. The residual deflection was taken 1 hour after unloading.

5.2 Small hard body impact

The test is to simulate impact caused by sharp or pointed objects such as trolleys and wheelchairs. A 3 kg / 50 mm diameter steel sphere impactor was used to simulate a hard body object. It was attached to a 600 mm long swinging arm.

5.2.1 Surface damage

This test is to determine the resistance of the partition to damage from impacts by small, hard body objects.

Ten positions on the main wall of the test setup were chosen for the test. Each position was subject to a 10 Nm impact energy. The swinging arm was raised by 0.33 m or an angle of 63.6 degree and released. The rebounce of the steel arm was withheld to prevent it from making a second impact.

The depth of indentation was taken after each impact for a position.

The test was repeated at a corner position 75 mm away from the corner edge.

5.2.2 Perforation

This test is to determine the resistance of the partition to perforation from impacts by small, hard objects.

Ten positions on the main wall of the test setup were chosen for the test. Each position was subject to a 30 Nm impact energy. The swinging arm was raised by 1 m or 131.8 degree and released. The rebounce of the steel arm was withheld to prevent it from making a second impact. The partition was inspected for any damage or perforation.

The test was repeated at a corner position 75 mm away from the corner edge.

5.3 Large soft body impact

The test is to simulate impact caused by people falling against or any large soft body object such as a ball hitting the partition wall. The impactor is a spheroconical bag of 600 mm X 400 mm filled with hardened glass beads. It has a total weight of 50 kg.

5.3.1 Resistance to surface damage

Two positions on the parititon wall were selected for the test. Each location was subject to a single swinging impact. A linear gauge was placed behind the impacted panel to measure the permanent deformation.

The impact energy was 100 Nm. The impactor was raised by 204 mm before releasing. Permanent deformation was taken after 5 minutes from the impact.

The test was repeated at a corner position 200 mm away from the corner edge.

5.3.2 Resistance to structural damage

Two positions on the partition wall were selected for the test. Each location was subject to three swinging impacts.

The impact energy was 120 Nm. The impactor was raised by 245 mm before releasing. The partition was inspected for any surface or structural damage.

5.4 Door slam

The test simulates a door being forcefully slammed by a person, wind or tensioned door closer.

A 60 kg door leaf was slammed through an opening angle of 60 degrees with a force of 15 kg for 100 times. Residual deflection was taken on the door frame at 1 m above the bottom of the door leaf after 5 minutes from the last slamming.

5.5 Crowd pressure

This test simulates a uniform band load such as a crowd leaning against the wall.

A test load of 3.0 kN/m was applied through a 2.5 m long wooden beam placed at a height of 1.2 m above the bottom of the wall. Deflection was taken at 125 mm above the beam. Residual deflection was taken after 5 minutes upon released of the load.

6. TEST RESULTS

6.1 Partition stiffness

Date of test: 28 Dec 2007
Lab temperature: 28.0 °C

Load (N)	Duration (min)	Deflection (mm)	Residual Defection (mm)	Condition of the specimen tested
Pretest load of 100 N	1	-0.11	-0.01	No damage was observed.
100	2	-0.10	-	
200	2	-0.19	-	
300	2	-0.30	-	
400	2	-0.41	-	
500	2	-0.52	-0.07	

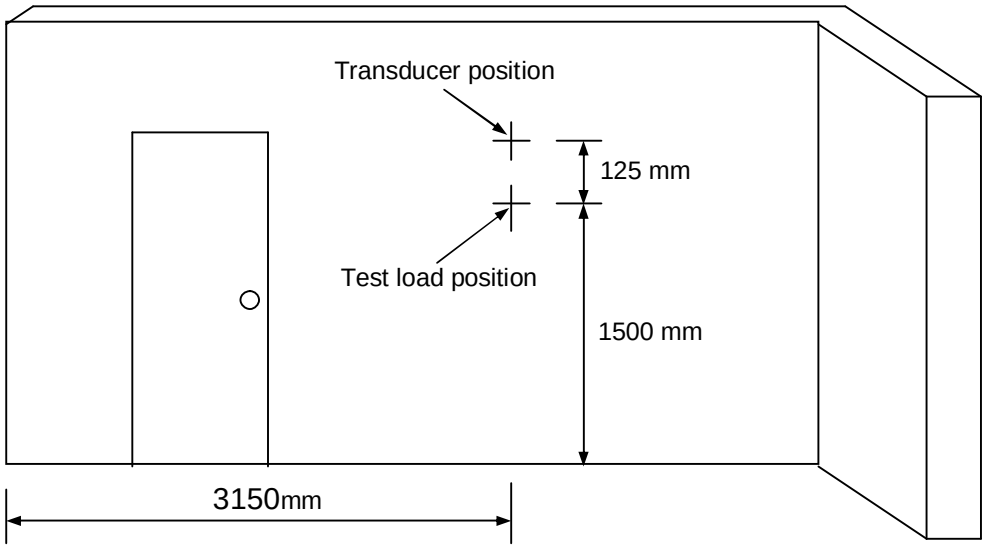


Figure 2: Location of applied load for partition stiffness test

6.2 Small hard body impact

6.2.1 Surface damage

Date of test : 27 Dec 2007
Lab temperature: 29.0 °C
Impact Energy : 10 Nm

Impact Position	Y (mm)	X (mm)	Depth of indentation (mm)	Condition of the specimen tested
1	430	2120	2.5	No damage or dislodgement of partition was observed.
2	750		2.7	
3	1050		3.3	
4	1250		3.5	
5	730	2630	2.3	
6	1250		3.5	
7	1840		3.5	
8	520	4320	2.3	
9	980		2.8	
10	1380		3.4	
**11	1000	75	2.9	

****Note: Corner junction

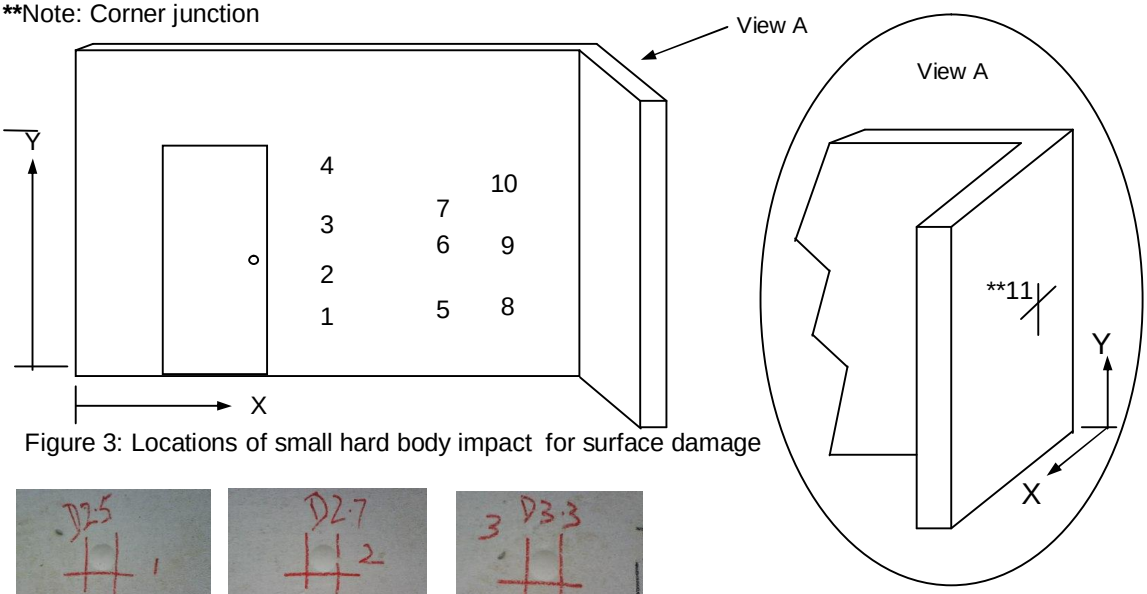
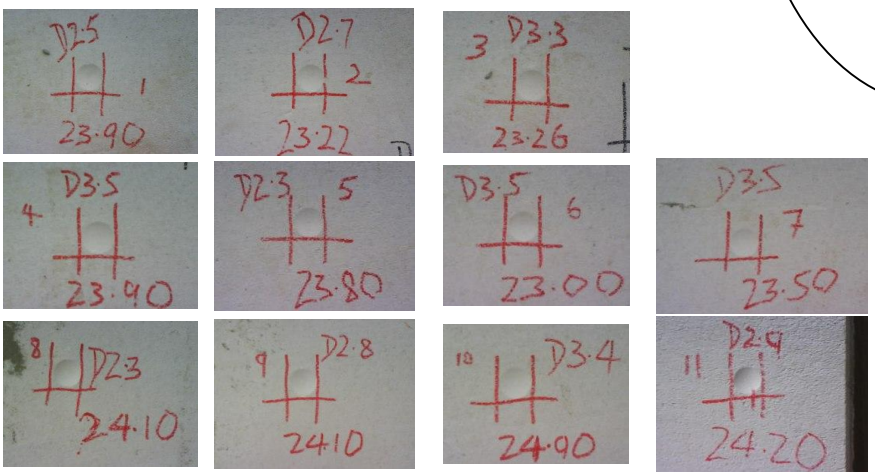


Figure 3: Locations of small hard body impact for surface damage



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6.2.2 Perforation

Date of test: 27 Dec 2007
Lab temperature: 29.0°C
Impact energy : 30 Nm

Impact Position	Y (mm)	X (mm)	Depth of indentation (mm)	Condition of the specimen tested
1	610	2220	4.1	No damage or dislodgement of partition was observed.
2	1030		5.6	
3	1350		7.1	
4	1550		7.9	
5	520	2570	5.2	
6	1030		6.5	
7	1710		7.7	
8	620	4360	5.4	
9	1180		7.1	
10	1630		6.8	
**11	1370	75	6.2	

**Note: Corner junction

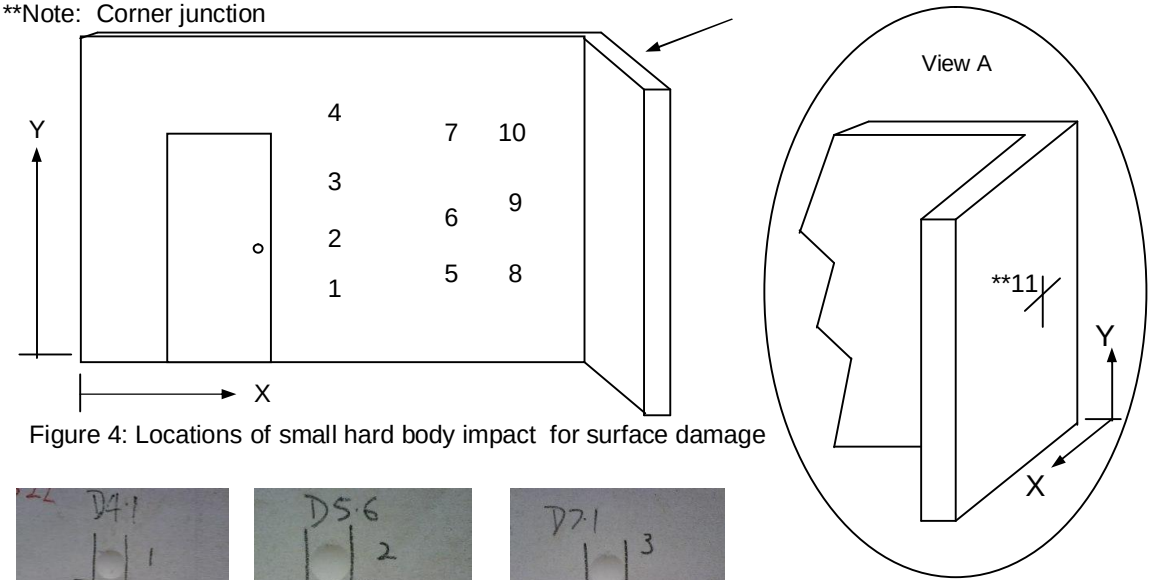
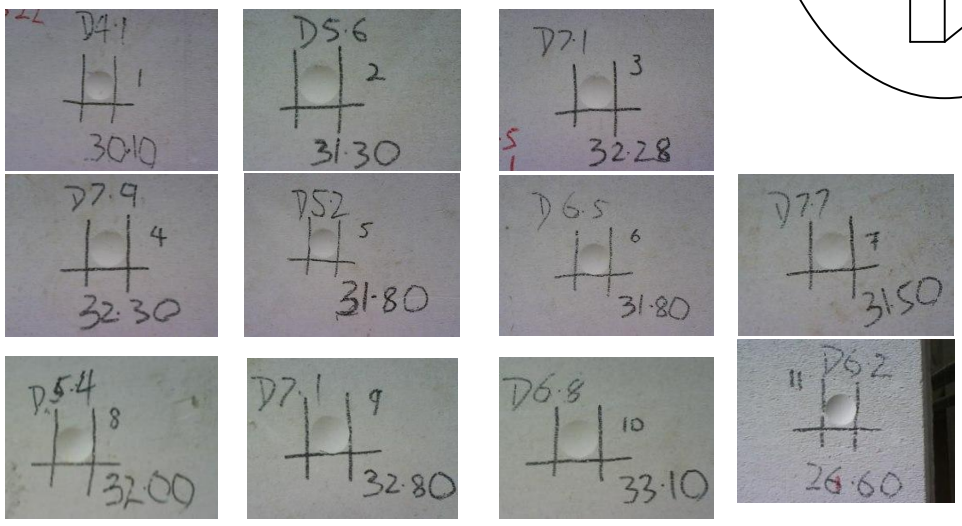


Figure 4: Locations of small hard body impact for surface damage



6.3 Large soft body impact

6.3.1 Resistance to damage

Date of test : 27 Dec 2007
Lab temperature: 28.5 °C
Impact Energy: 100 Nm

Impact Position	Y (mm)	X (mm)	Residual deflection (mm)	Condition of the specimen tested
1	1500	2600	0.1	No damage observed.
2	1570	3930	0.1	
**3	1245	200	0.0	

**Note: Corner junction

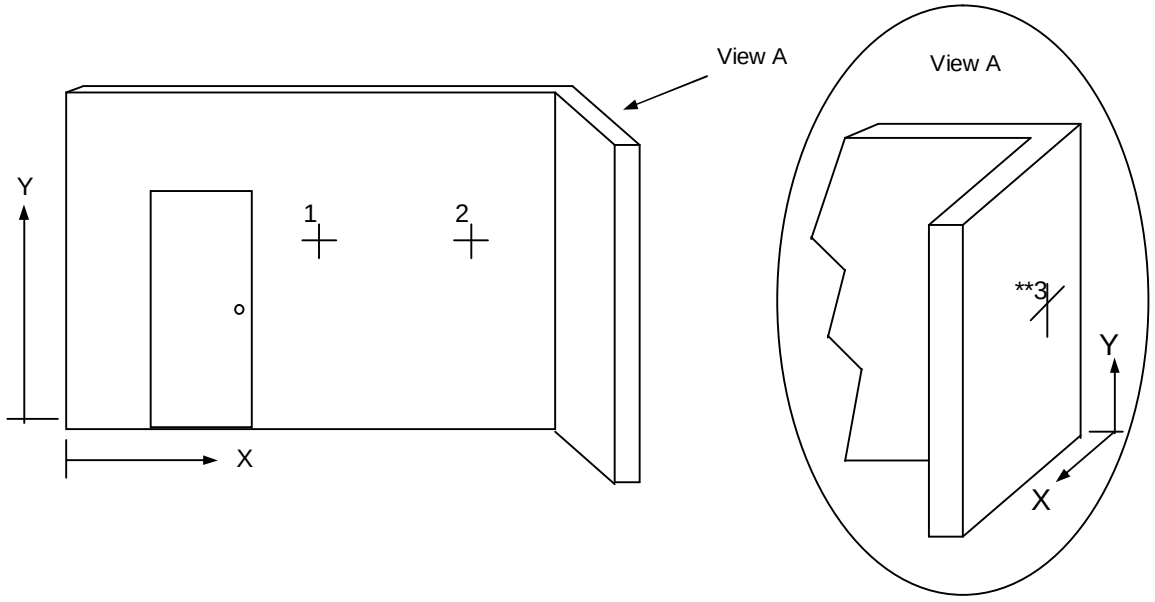


Figure 5: Locations of large soft body impact for resistance to damage

6.3.2 Resistance to structural damage by multiple impacts

Date of test : 27 Dec 2007
Lab temperature: 29.3 °C
Impact Energy: 120 Nm

Impact Position	Y (mm)	X (mm)	Condition of the specimen tested
1	1500	2040	No damage observed.
2	1450	3190	

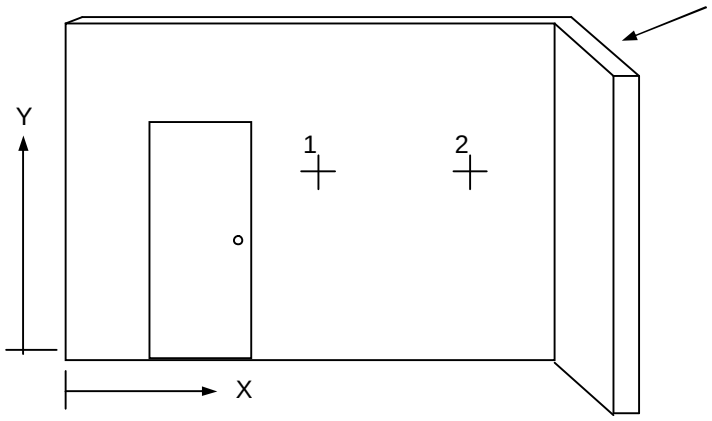


Figure 6: Locations of large soft body impact for resistance to structural damage

6.4 Door Slaming

Date of test : 26 Dec 2007
Lab temperature: 29.0 °C

Open door to 60° ± 1° (Number of slam)	Residual deflection (mm)	Condition of the specimen tested
Pretest of 3	-0.60	No damage was observed
100	-0.76	

6.5 Crowd Pressure

Date of test : 28 Dec 2007
Lab temperature: 29.5 °C

Load	Duration (min)	Deflection (mm)	Residual Deflection (mm)	Condition of the specimen tested
Pretest load of 200 (N)	1	-0.11	-0.02	No crackline or damage was observed.
3.0 KN/M	2	-4.87	-0.12	

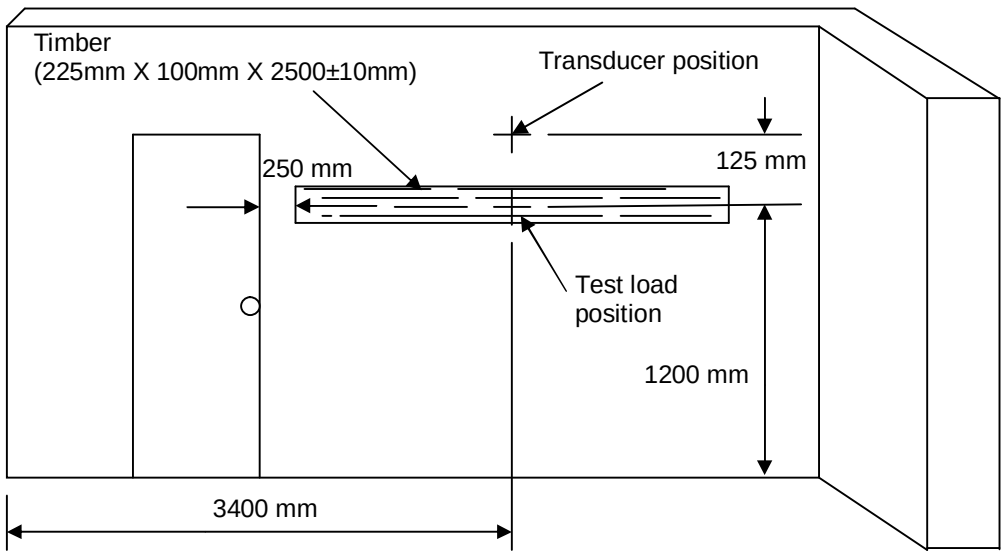


Figure 7: Locations of applied load for crowd pressure

7. CONCLUSION

The partition system meets the severe duty grade requirements of SS492 :2001 & BS 5234 Part 2: 1992.

The partition system has also achieved the following performance:

Crowd pressure	:	3.0 kN/m

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APPENDIX: TEST SET-UP

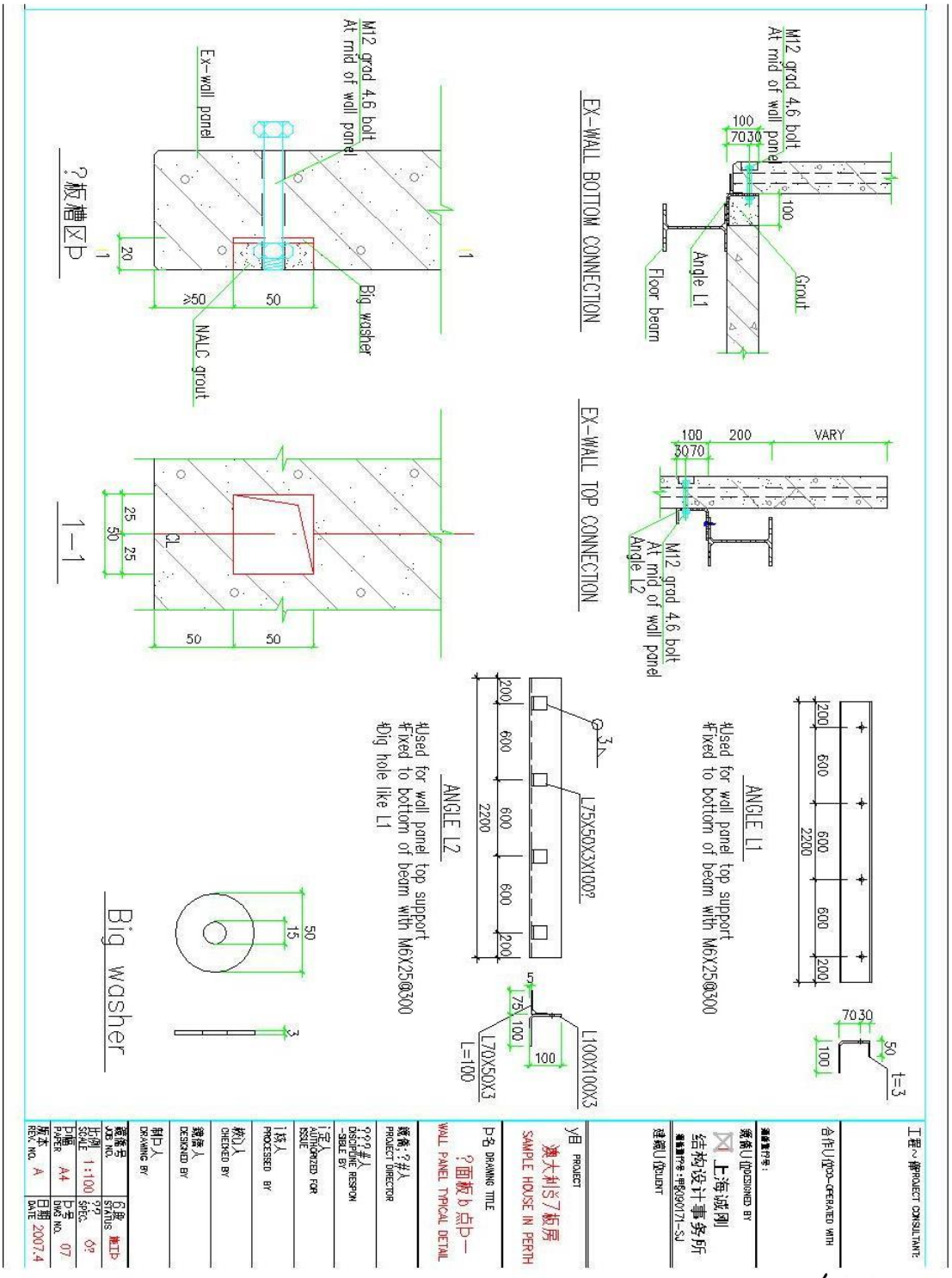
Door Slamming Test

Large Soft Body Impact – Resistance to Damage

Stiffness Test

Crowd Pressure Test

The following drawing informations were supplied by GISS Pty Ltd.



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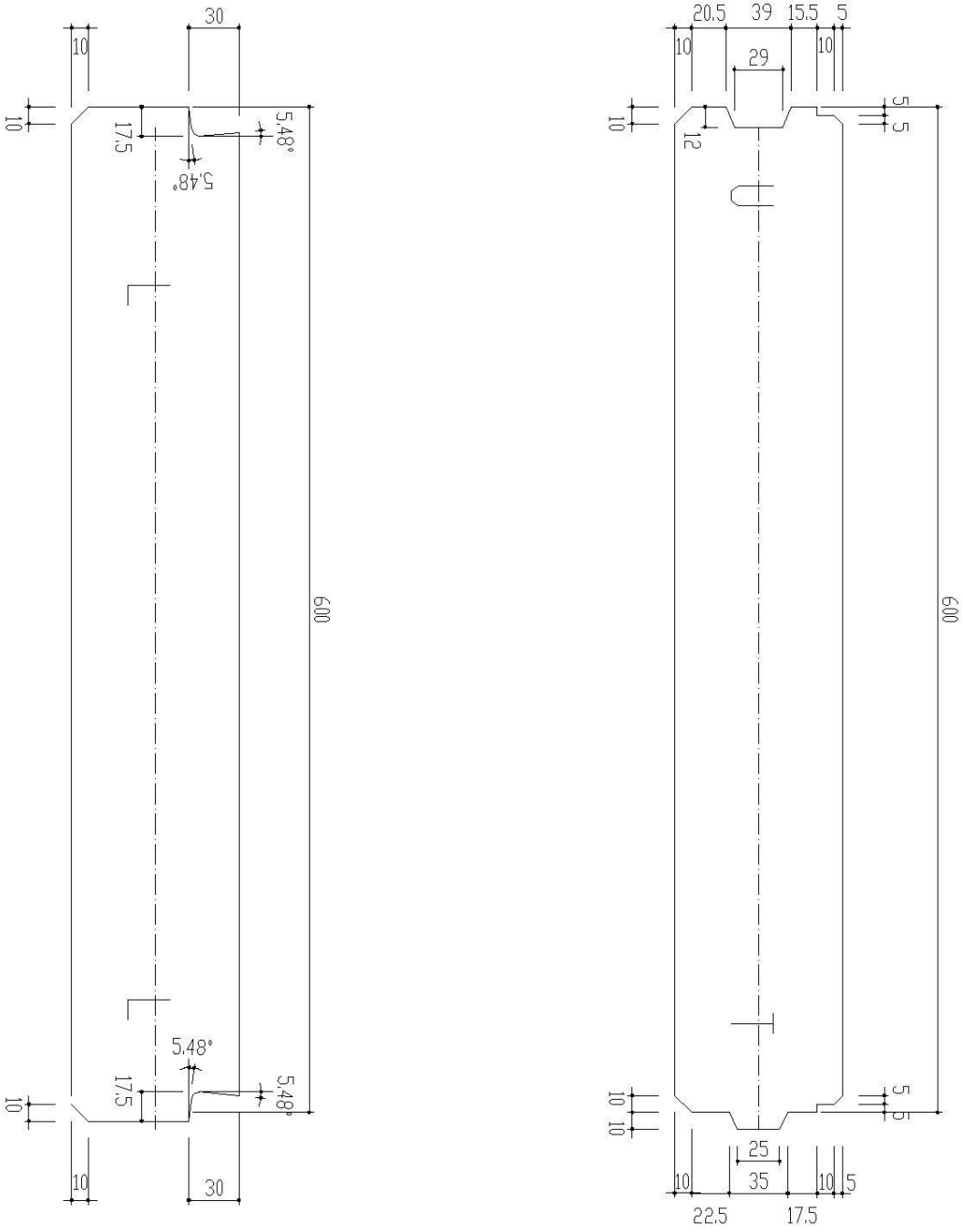

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