TECHNOLOGY CENTRE

Technical Report

Title: Wind resistance testing a Barracuda brick slip system

Report No: N950-22-18408

Technical Report

Title: Wind resistance testing a Barracuda brick slip system

Customer: James & Taylor Ltd,
Sixty-Two, Barwell Business Park,
Leatherhead Road, Chessington, Surrey KT9 2NY.

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VTC job no.: TR0220-3WK2

Author(s): D. Bennett - Technician

Checked by: N. McDonald – Manager

Authorised by: S. R. Moxon – Operations Director

Distribution: 1 copy to James & Taylor
(confidential) 1 copy to project file

UKAS TESTING
0057

VINCI Technology Centre UK Limited,
Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4QH

Registered Office, Watford. Registered No. 05640885 England.

Tel. 0333 5669000
email info@technology-centre.co.uk
web www.technology-centre.co.uk

CONTENTS

1 INTRODUCTION

This report describes tests carried out at VINCI Technology Centre UK Limited at the request of James & Taylor Limited.

The test sample consisted of a Barracuda brick slip system supplied by James & Taylor.

The tests were carried out on 26 September 2022 and were to determine the wind resistance of the test sample. The test methods were in accordance with the CWCT Standard Test Methods for building envelopes, 2005, for:

Wind resistance – serviceability & safety.

This test report relates only to the actual sample as tested and described herein.

The results are valid only for sample(s) tested and the conditions under which the tests were conducted.

The long-term durability of the façade system is not assessed by these test methods.

VINCI Technology Centre UK Limited is accredited to ISO/IEC 17025:2017 by the United Kingdom Accreditation Service as UKAS Testing Laboratory No. 0057 for a schedule of tests. Tests listed above and marked with an asterisk are not on our schedule.

VINCI Technology Centre UK Limited is Approved Body No. 1766.

VINCI Technology Centre UK Limited is certified by BSI for:

- ISO 9001 Quality Management System,
- ISO 14001 Environmental Management System,
- ISO 45001 Occupational Health and Safety Management System.

The tests were witnessed in part by John Champion of James & Taylor.

2 SUMMARY AND CLASSIFICATION OF TEST RESULTS

The following summarises the results of the tests carried out. For full details refer to Section 6.

2.1 SUMMARY OF TEST RESULTS

TABLE 1

Date	Test number	Test description	Result
26 September 2022	1	Wind resistance – serviceability	Pass
26 September 2022	2	Wind resistance – safety	Pass
10 November 2022	3	Controlled dismantle	Pass

2.2 CLASSIFICATION

TABLE 2

Test	Standard	Classification / Declared value
Wind resistance	CWCT / BS EN 13116	±2400 pascals serviceability ±3600 pascals safety

3 DESCRIPTION OF TEST SAMPLE

3.1 GENERAL ARRANGEMENT

The sample was as shown in the photo below and the drawings included as an appendix to this report.

The test sample comprised 9 different brick slip types.

TABLE 3

Brick Types Selected for Independent Testing	
Brick Type No.	**Brick Type**
1	Wienerberger Sandalwood Yellow Multi
2	Michelmersh Charnwood Light Victorian Red
3	Ibstock Leicester Red Stock
4	Ibstock Chesterton Multi Red Smooth
5	Blockley Windermere Grey Solid
6	Wienerberger Olde Ivory Stock
7	Wienerberger Smeed Dean London Stock
8	Ibstock Aldridge Anglian Red Multi Rustic
9	Michelmersh Hadley Brindle Wirecut

PHOTO 45141

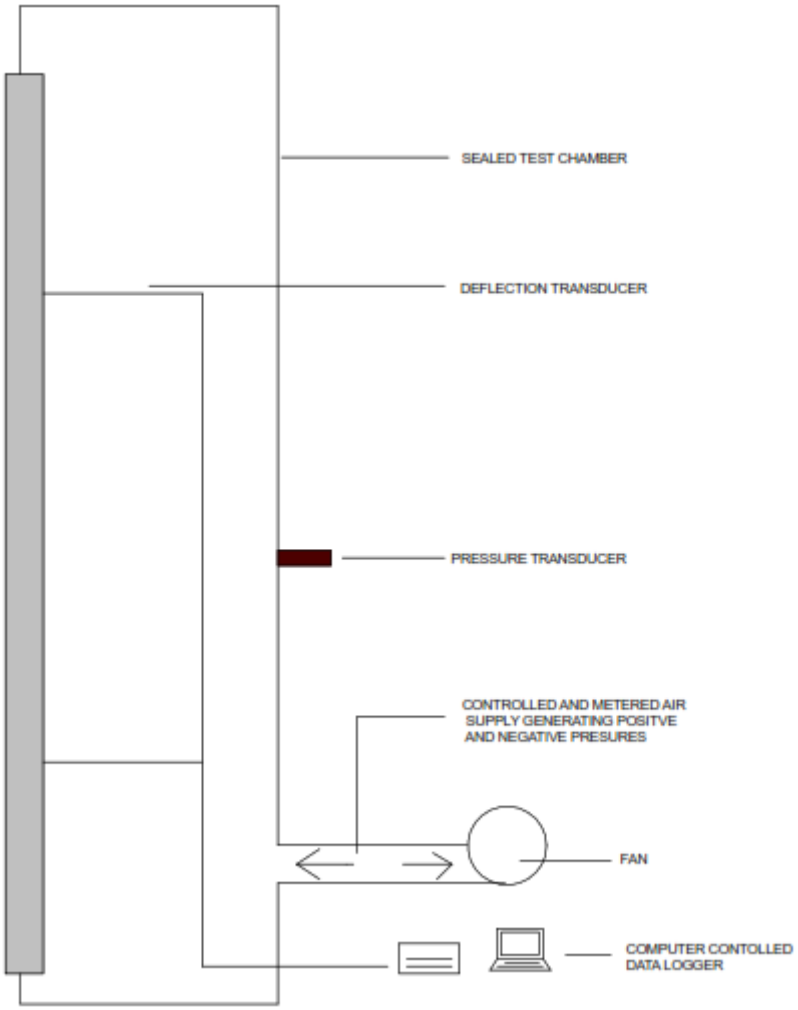
TEST SAMPLE ELEVATION

4 TEST RIG GENERAL ARRANGEMENT

The test sample was mounted on a rigid test rig with support steelwork designed to simulate the on-site/project conditions. The test rig comprised a well sealed chamber, fabricated from steel and plywood. A door was provided to allow access to the chamber. Representatives of James & Taylor installed the sample on the test rig. See Figure 1.

FIGURE 1

TEST RIG SCHEMATIC ARRANGEMENT



SECTION THROUGH TEST RIG

5 TEST SEQUENCE

The test sequence was as follows:

(1) Wind resistance - serviceability

(2) Wind resistance – safety

(3) Controlled dismantle

6 TESTING

6.1 INSTRUMENTATION

6.1.1 Pressure

One static pressure tapping was provided to measure the chamber pressure and was located so that the readings were unaffected by the velocity of the air supply into or out of the chamber.

A pressure transducer, capable of measuring rapid changes in pressure to within 2% was used to measure the differential pressure across the sample.

6.1.2 Deflection

Displacement transducers were used to measure the deflection of principle framing members to an accuracy of 0.1 mm. The gauges were set normal to the sample framework at mid-span and as near to the supports of the members as possible and installed in such a way that the measurements were not influenced by the application of pressure or other loading to the sample. The gauges were located at the positions shown in Figure 2.

6.1.3 Temperature

Platinum resistance thermometers (PRT) were used to measure air temperatures to within 1°C.

6.1.4 General

Electronic instrument measurements were scanned by a computer controlled data logger, which also processed and stored the results.

All measuring instruments and relevant test equipment were calibrated and traceable to national standards.

6.2 FAN

The air supply system comprised a variable speed centrifugal fan and associated ducting and control valves to create positive and negative static pressure differentials. The fan provided essentially constant air flow at the fixed pressure for the period required by the tests and was capable of pressurising at a rate of approximately 600 pascals in one second.

6.3 PROCEDURE

6.3.1 Wind Resistance – serviceability

Three positive pressure differential pulses of 1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one positive pressure differential pulse from 0 to 2400 pascals to 0. The pressure was increased in four equal increments each maintained for 15 ±5 seconds. Displacement readings were taken at each increment. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

Three negative pressure differential pulses of -1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one negative pressure differential pulse from 0 to -2400 pascals to 0. The pressure was increased in four equal increments each maintained for 15 ±5 seconds. Displacement readings were taken at each increment. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

6.3.2 Wind Resistance – safety

Three positive pressure differential pulses of 1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one positive pressure differential pulse from 0 to 3600 pascals to 0. The pressure was increased as rapidly as possible but not in less than 1 second and maintained for 15 ±5 seconds. Displacement readings were taken at peak pressure. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

Three negative pressure differential pulses of -1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

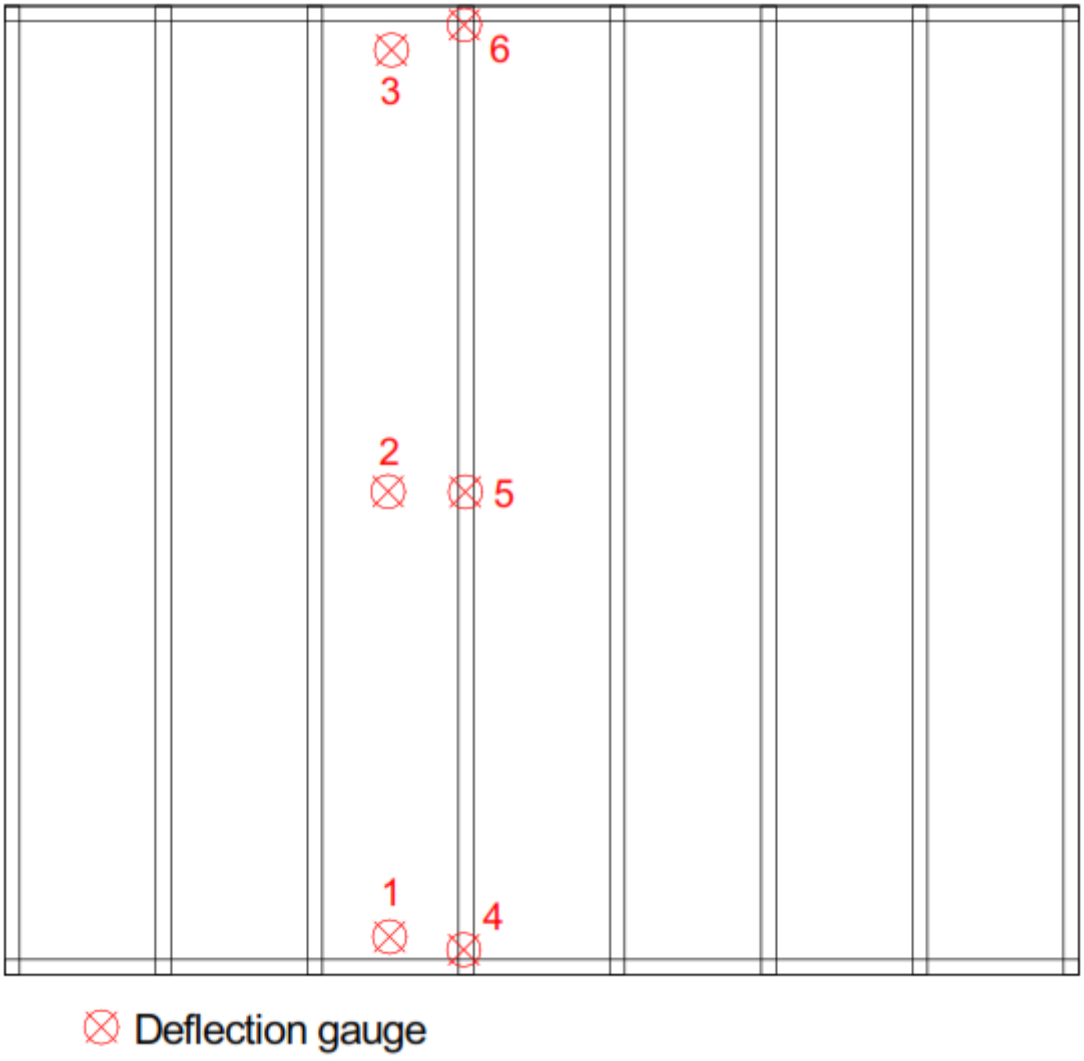
The sample was subjected to one negative pressure differential pulse from 0 to -3600 pascals to 0. The pressure was increased as rapidly as possible but not in less than 1 second and maintained for 15 ±5 seconds. Displacement readings were taken at peak pressure. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

FIGURE 2

DEFLECTION GAUGE LOCATIONS

Internal View



6.4 PASS/FAIL CRITERIA

6.4.1 Calculation of permissible deflection

Serviceability Test TABLE 4

Gauge number	Member	Span (L) (mm)	Permissible deflection (mm)	Permissible residual deformation
2	Brick slips	2987	L/200 = 14.9	BS EN 13116: 5% of measured deflection
5	Vertical stud	2987	L/200 = 14.9	CWCT: 1 mm

Safety Test TABLE 5

Gauge number	Member	Span (L) (mm)	Permissible deflection (mm)	Permissible residual deformation
2	Brick slips	2987	n/a	L/500 = 6.0 mm
5	Vertical stud	2987	n/a	L/500 = 6.0 mm

6.5 RESULTS

Test 3 (serviceability) Date: 26 September 2022

The deflections measured during the wind resistance test, at the positions shown in Figure 2, are shown in Tables 8 and 9.

Summary:

Serviceability Test TABLE 6

Gauge number	Member	Pressure differential (Pa)	Measured deflection (mm)	Residual deformation (mm)
2	Brick slips	2399 -2391	4.4 -7.2	0.3 -0.4
5	Vertical stud	2399 -2391	6.7 -8.1	0.4 -0.3

No damage to the test sample was observed.

Ambient temperature = 13°C
Chamber temperature = 13°C

Test 4 (safety) Date: 26 September 2022

The deflections measured during the structural safety test, at the positions shown in Figure 2, are shown in Table 10.

Summary

Safety Test TABLE 7

Gauge number	Member	Pressure differential (Pa)	Measured deflection (mm)	Residual deformation (mm)
2	Brick slips	3591 -3604	6.9 -9.2	0.5 -0.7
5	Vertical stud	3591 -3604	10.3 -11.7	0.4 -0.7

No damage to the sample was observed.

Ambient temperature = 14°C
Chamber temperature = 14°C

TABLE 8

WIND RESISTANCE – POSITIVE **SERVICEABILITY** TEST RESULTS

Position	**Pressure (pascals) / Deflection (mm)**				
	614	**1205**	**1805**	**2399**	**Residual**
1	1.3	2.4	3.7	5.1	0.1
2	2.2	4.4	7.1	10.0	0.5
3	1.4	2.8	4.5	6.3	0.3
4	1.0	1.9	2.8	3.7	0.1
5	2.3	4.6	7.5	10.7	0.5
6	1.0	2.0	3.1	4.3	0.2
2 *	0.9	1.8	3.1	4.4	0.3
5 *	1.3	2.6	4.6	6.7	0.4

* Mid-span reading adjusted between end support readings

TABLE 9

WIND RESISTANCE – NEGATIVE **SERVICEABILITY** TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)				
	-598	**-1197**	**-1794**	**-2391**	**Residual**
1	-1.7	-3.2	-4.7	-6.5	0.1
2	-2.8	-6.1	-10.1	-14.6	-0.6
3	-1.5	-3.3	-5.6	-8.3	-0.6
4	-1.1	-1.9	-2.8	-3.8	0.2
5	-2.6	-5.4	-8.8	-12.7	-0.5
6	-1.0	-2.0	-3.5	-5.3	-0.5
2 *	-1.2	-2.9	-4.9	-7.2	-0.4
5 *	-1.5	-3.4	-5.6	-8.1	-0.3

* Mid-span reading adjusted between end support readings

TABLE 10

WIND RESISTANCE - **SAFETY** TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)			
	3591	**Residual**	**-3604**	**Residual**
1	7.3	0.1	-9.5	-0.9
2	15.3	0.8	-19.9	-1.9
3	9.5	0.6	-11.9	-1.5
4	5.1	-0.1	-5.2	-1.1
5	16.1	0.6	-18.4	-2.0
6	6.5	0.5	-8.1	-1.5
2 *	6.9	0.5	-9.2	-0.7
5 *	10.3	0.4	-11.7	-0.7

* Mid-span reading adjusted between end support readings

6.6 CONTROLLED DISMANTLING

During the dismantling of the sample no discrepancies from the drawings were found.

PHOTO 6137

TEST SAMPLE DURING DISMANTLE

PHOTO 6145

TEST SAMPLE DURING DISMANTLE

PHOTO 6156

TEST SAMPLE DURING DISMANTLE

PHOTO 6157

TEST SAMPLE DURING DISMANTLE

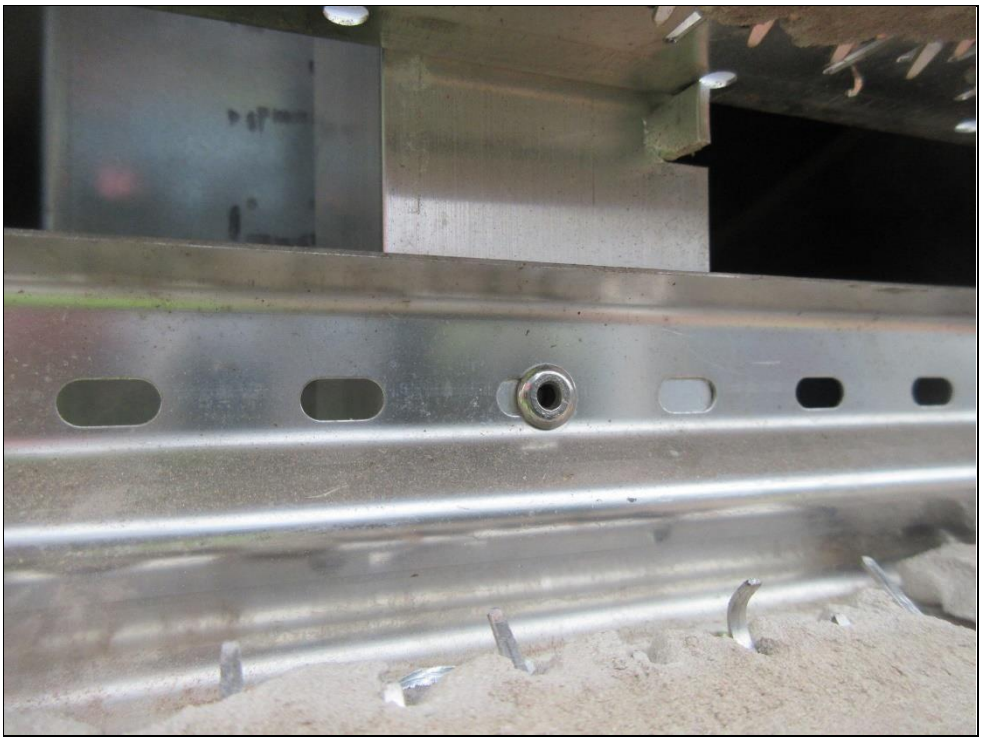


PHOTO 6158

TEST SAMPLE DURING DISMANTLE

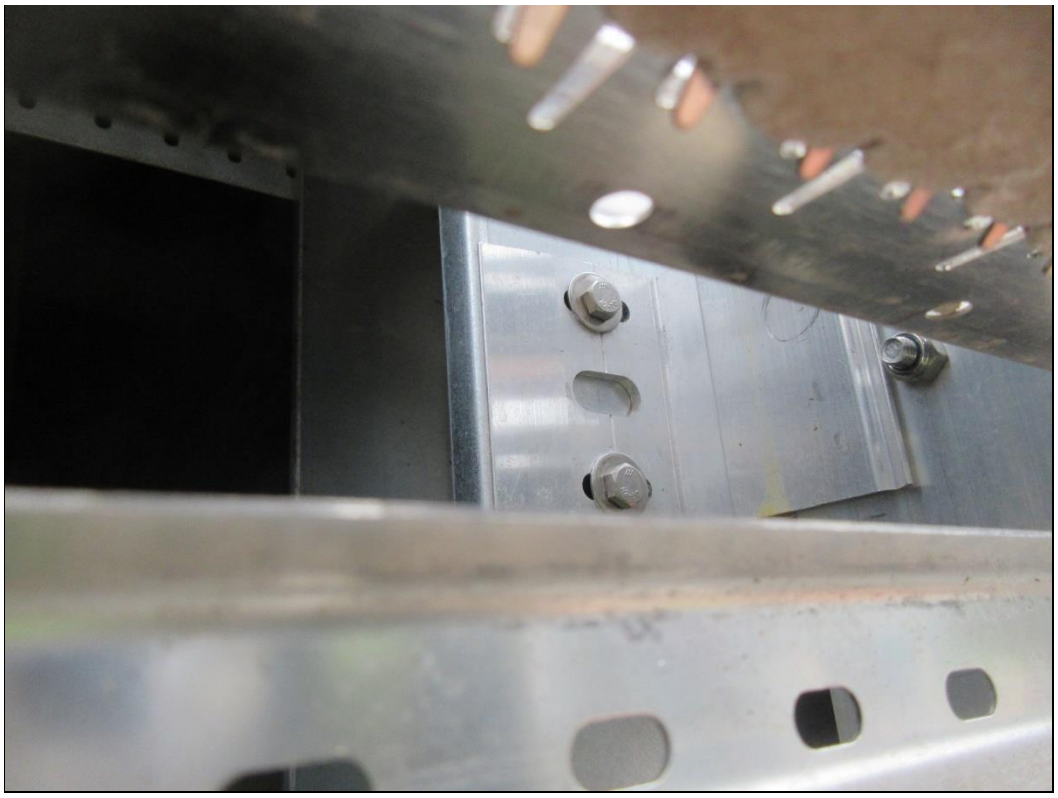


PHOTO 6159

TEST SAMPLE DURING DISMANTLE

PHOTO 6160

BRICK SLIPS REMOVED FROM TEST RIG

PHOTO 6181

SUPPORT FRAME REMOVED FROM TEST RIG

7 APPENDIX - DRAWINGS

The following 4 unnumbered pages are copies of James & Taylor Limited drawings numbered:

BSS-TRA-GA-001,

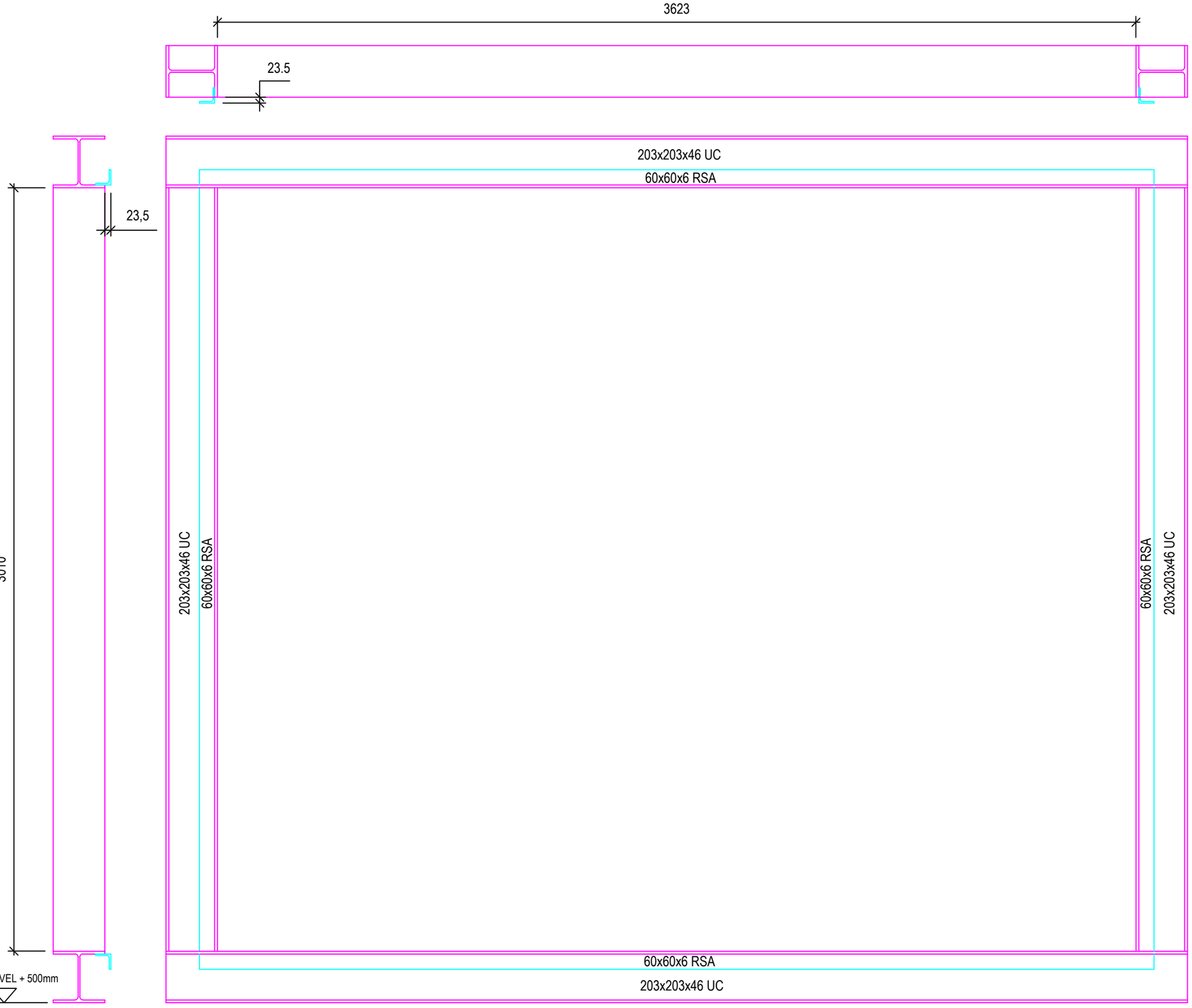
BSS-TRA-GA-002,

BSS-TRA-GA-003,

BSS-TRA-T3.

END OF REPORT

TEST RIG TYPE A
STEEL FRAMING (TO BE PROVIDED BY TECHNOLOGY CENTRE)



JAMES &TAYLOR
SIXTY TWO, Barwell Business Park, Leatherhead Road,
Chessington, Surrey KT9 2NY
T. 020 8942 3688 F. 020 8336 2036 E. info@jamesandtaylor.co.uk
www.jamesandtaylor.co.uk

GENERAL NOTES:

DO NOT SCALE FROM THIS DRAWING.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT JAMES & TAYLOR, ARCHITECT'S AND ENGINEER'S DRAWINGS.

STEEL FRAMING REQUIREMENT

203x203x46 UC (AS DRAWN)
60x60x6 RSA (AS DRAWN)

REVISIONS: DATE:

CLIENT:
JAMES & TAYLOR LTD

PROJECT:
BRICK SLIP SYSTEM

TITLE:
TEST RIG TYPE A
GENERAL ARRANGEMENT

DATE:
03/12/2021

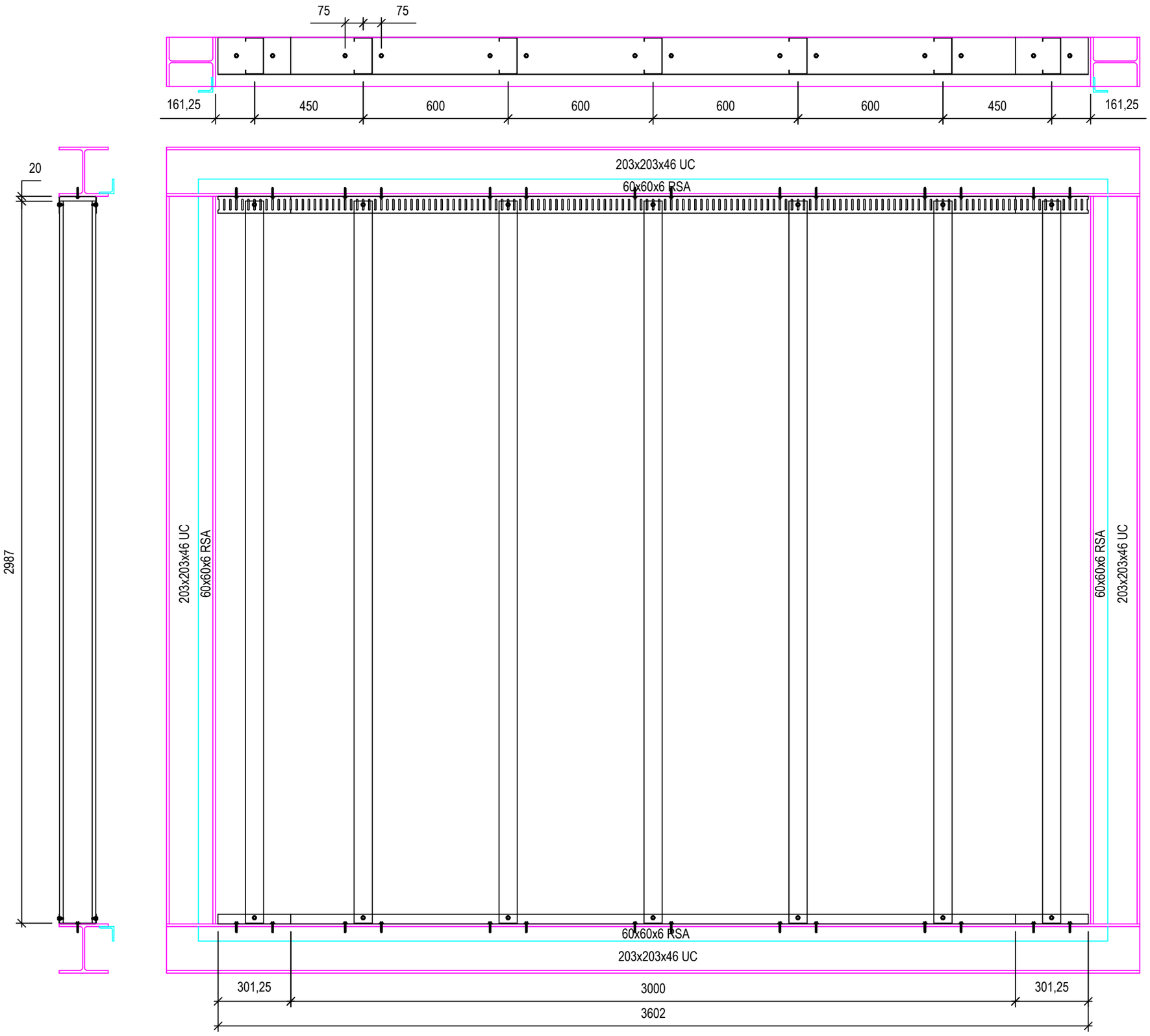
DRAWN BY: JSC
CHECKED BY: JSC

SCALE: 1:16
PLOT SIZE: A3

DRAWING NUMBER: BSS-TRA-GA-001
REVISION:

PLOT DATE:
December 5, 2021 5:34 PM

TEST RIG TYPE A
METSEC BACKING WALL; STUDWORK, BASE, AND HEAD TRACK SETTING OUT/CONFIGURATION



JAMES &TAYLOR
SIXTY TWO, Barwell Business Park, Leatherhead Road,
Chessington, Surrey KT9 2NY
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METSEC REQUIREMENT

VERTICAL STUDS
150M12-75 (THEORETICAL LENGTH 2987mm) = 7 No.

BASE TRACK
154M12-40 (THEORETICAL LENGTH 3602mm) = 1 No.

HEAD TRACK
154M16-70s (THEORETICAL LENGTH 3602mm) = 1 No.

REVISIONS: DATE:

CLIENT:
JAMES & TAYLOR LTD

PROJECT:
BRICK SLIP SYSTEM

TITLE:
TEST RIG TYPE A
GENERAL ARRANGEMENT

DATE:
03/12/2021

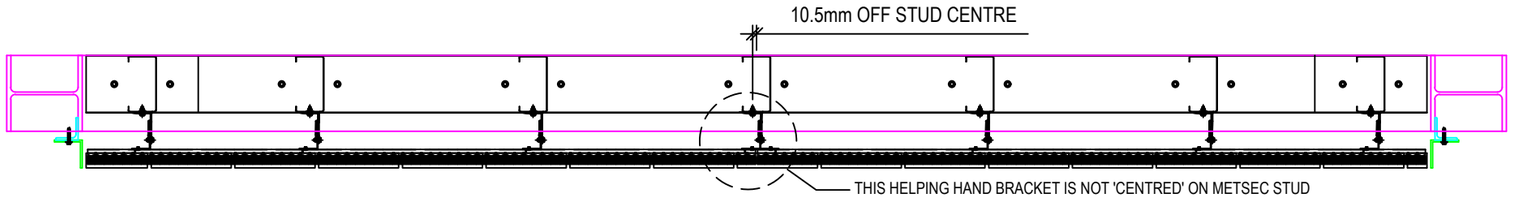
DRAWN BY: JSC
CHECKED BY: JSC

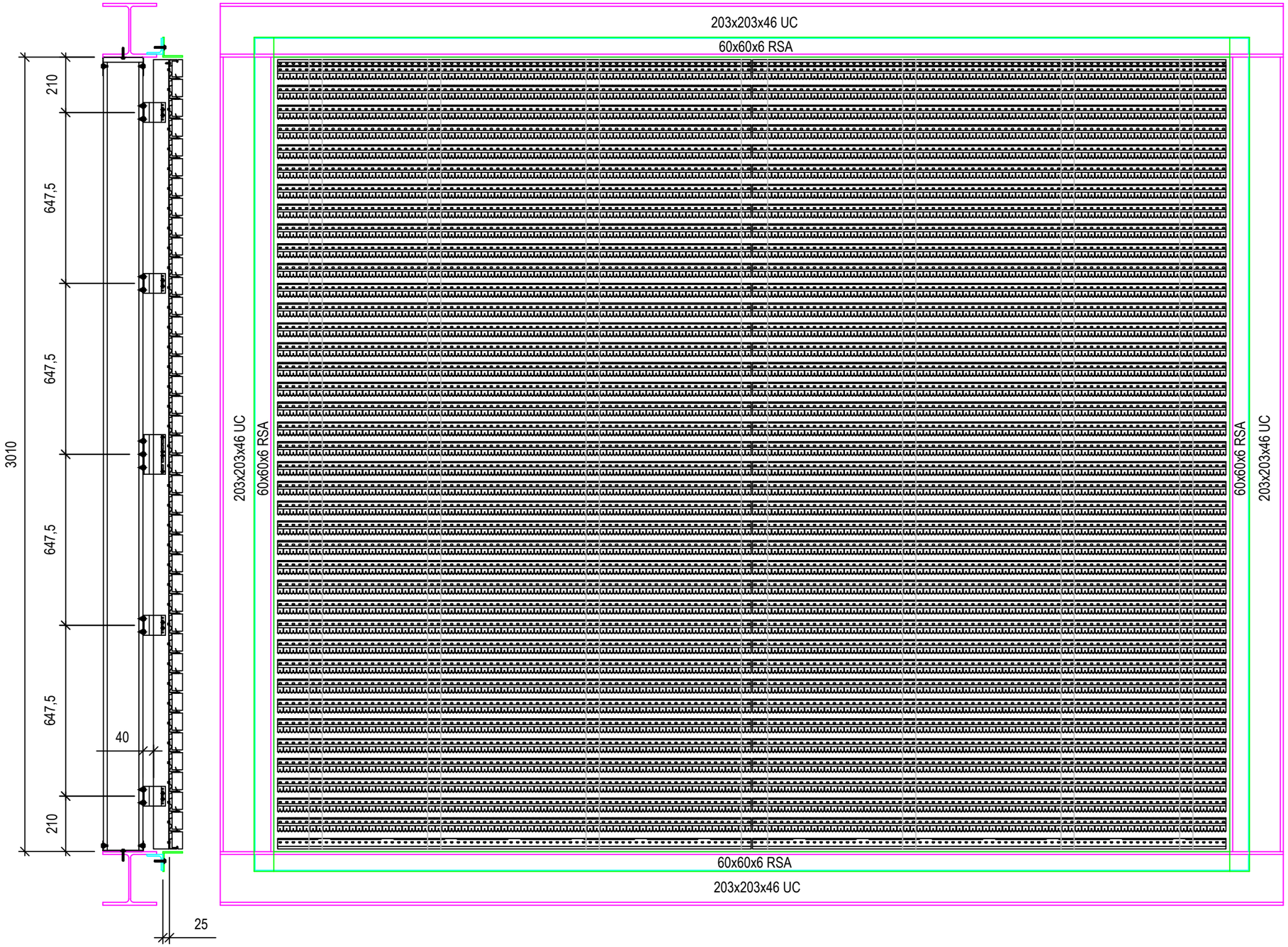
SCALE: 1:16
PLOT SIZE: A3

DRAWING NUMBER: BSS-TRA-GA-002
REVISION:

PLOT DATE:
January 16, 2022 6:18 PM

TEST RIG TYPE A
'HELPING HAND' BRACKET, VERTICAL SUB-STRUCTURE AND BARRACUDA RAIL SETTING OUT/CONFIGURATION





JAMES &TAYLOR
SIXTY TWO, Barwell Business Park, Leatherhead Road,
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BARRACUDA HORIZONTAL RAIL REQUIREMENT

BAR-R1-1800 = 78 No.
BAR-R2-1800 = 2 No.
BAR-R3-1800 = 2 No.

BARRACUDA VERTICAL RAIL REQUIREMENT

BAR-VL1-2990 = 6 No.
BAR-VT1-2990 = 1 No.

'HELPING HAND' BRACKET REQUIREMENT
Nvelope 90 (ADJUSTMENT RANGE 92mm TO 132mm)

VERTICAL LOAD BEARING HELPING HAND = 7 No.
RESTRAIN HELPING HAND = 28 No.

REVISIONS: DATE:

CLIENT:
JAMES & TAYLOR LTD

PROJECT:
BRICK SLIP SYSTEM

TITLE:
TEST RIG TYPE A
GENERAL ARRANGEMENT

DATE:
03/12/2021

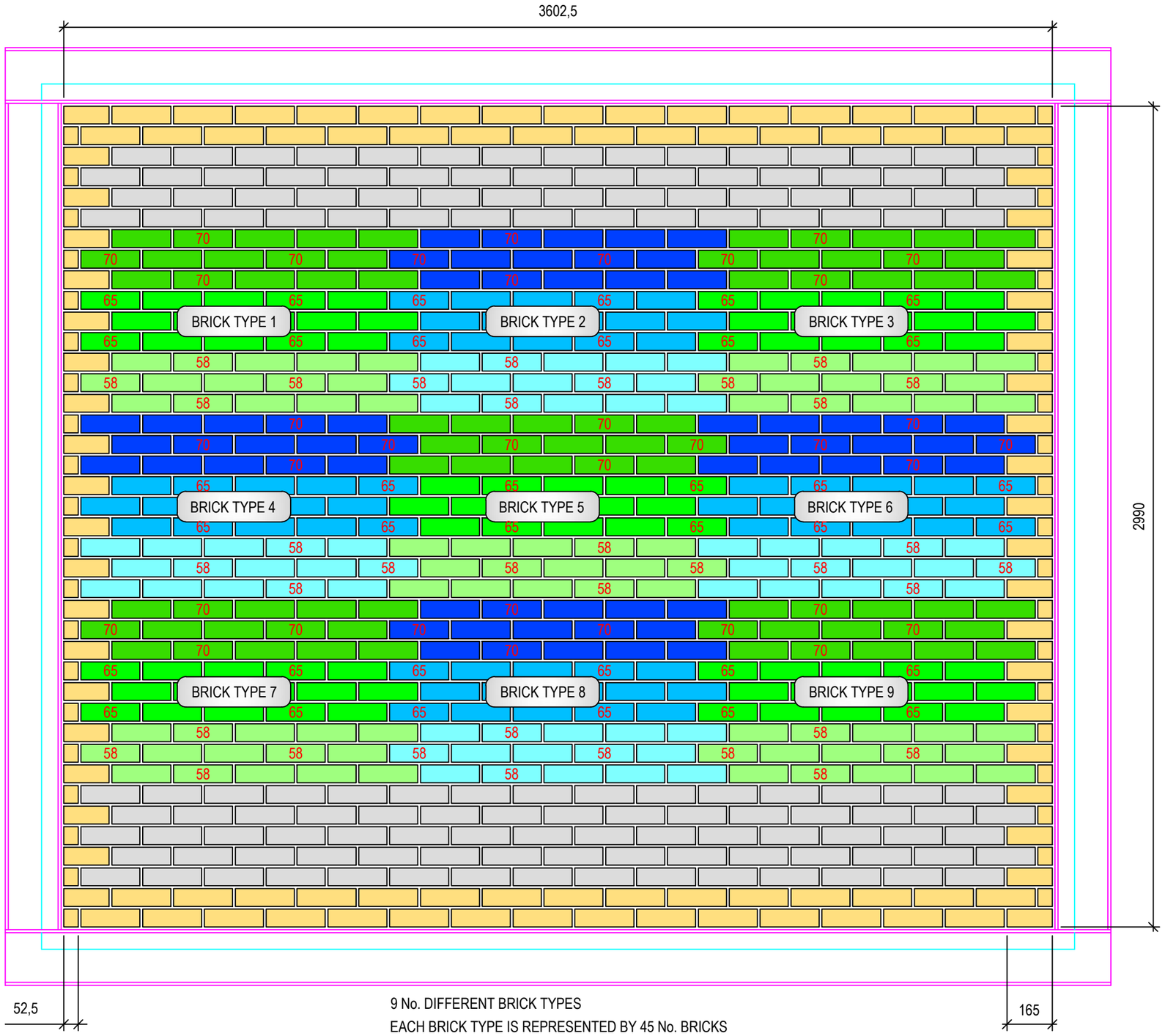
DRAWN BY: JSC
CHECKED BY: JSC

SCALE: 1:16
PLOT SIZE: A3

DRAWING NUMBER: BSS-TRA-GA-003
REVISION:

PLOT DATE:
January 16, 2022 6:56 PM

TEST RIG TYPE A - TEST 3 [WATER PENETRATION AND WIND RESISTANCE]



9 No. DIFFERENT BRICK TYPES

EACH BRICK TYPE IS REPRESENTED BY 45 No. BRICKS

MEDIAN HEIGHT BRICKS = 15 No.

SMALL BRICKS = 4 No. 58mm HIGH AND 11 No. MEDIAN HEIGHT [26.66%]

LARGE BRICKS = 4 No. 70mm HIGH AND 11 No. MEDIAN HEIGHT [26.66%]

JAMES &TAYLOR
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Chessington, Surrey KT9 2NY
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www.jamesandtaylor.co.uk

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= BLOCKLEY WINDERMERE GREY SOLID

215mm LONG 'STANDARD' SLIPS = 135 No.

= WIENERBERGER STAFFORDSHIRE SMOOTH CREAM

215mm LONG 'STANDARD' SLIPS = 30 No.

165mm LONG 'STANDARD' SLIPS = 38 No.

52mm LONG 'STANDARD' SLIPS = 38 No.

215mm LONG SLIPS WITH 'TOP' REBATE = 15 No.

215mm LONG SLIPS WITH 'BOTTOM' REBATE = 15 No.

165mm LONG SLIPS WITH 'TOP' REBATE = 1 No.

165mm LONG SLIPS WITH 'BOTTOM' REBATE = 1 No.

52mm LONG SLIPS WITH 'TOP' REBATE = 1 No.

52mm LONG SLIPS WITH 'BOTTOM' REBATE = 1 No.

REVISIONS: DATE:

CLIENT:
JAMES & TAYLOR LTD

PROJECT:
BRICK SLIP SYSTEM

TITLE:
TEST RIG TYPE A - TEST 3 WATER PENETRATION AND WIND RESISTANCE

DATE:
04/12/2021

DRAWN BY: JSC

CHECKED BY: JSC

SCALE: 1:16

PLOT SIZE: A3

DRAWING NUMBER: BSS-TRA-T3

REVISION:

PLOT DATE:
December 5, 2021 5:39 PM

VINCI Technology Centre UK Limited
Stanbridge Road
Leighton Buzzard
Bedfordshire
LU7 4QH
UK

0333 5669000

info@technology-centre.co.uk

www.technology-centre.co.uk