



SCHLEGEL PTY LIMITED
ABN 27 000 419 876

ACCREDITED LABORATORY



NO. 1764

PAGE 1 OF 10

ISSUE DATE 12/07/04

TEST REPORT NO : NSW 850-901389

ON BEHALF OF

REHAU
91 DERBY STREET
SILVERWATER NSW 2128

SAMPLE DETAIL

A PVCU WINDOW ASSEMBLY CONSISTING OF A RIGHT HAND
TILT-TURN WINDOW SYSTEM AND ONE LEFT HAND FIXED SASH.

CONFIDENTIAL TO THE CLIENT AND SCHLEGEL PTY LIMITED

The results and conclusions shown in this report are given in good faith and SCHLEGEL Pty. Ltd. Accepts no responsibility for any loss or damage occurring from the use of same. It should be noted the results contained in this report relate only to the specific individual sample tested.

This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation.

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L. Fleming

Authorised Signatory



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EXPLANTORY NOTES



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TERMINOLOGY, EXPLANATION OF AUTHORITIES, REFERENCES ETC

This Test Report certifies the performance of a sample submitted to Schlegel Pty Ltd for testing within their N.A.T.A. accredited facility, # 1764, which was accredited by N.A.T.A. (National Association of Testing Authorities) on 29.07.83.

The facility referred to is the Schlegel Mobile Testing Laboratory, which is operated by N.A.T.A. approved Schlegel Technicians, and is located either at the Schlegel Headquarters, 44-48 Riverside Road, CHIPPING NORTON, N.S.W. 2170, or at any location in Australia or overseas.

N.A.T.A. the National Association of Testing Authorities has its headquarters at 7 Leeds Street, RHODES, N.S.W. 2138. The Association was formed in 1947 to govern testing laboratory standards of practice within Australia and to maintain the integrity of test reporting issued by members.

The Schlegel Mobile Testing Laboratory has been accredited for specific testing within the field of Mechanical Testing.

Tests carried out may be as stated or, as is generally the case in conformity to specific standards.

The majority of Standards utilised by Schlegel Mobile Laboratories are AS 2047 –1999 “Windows in Buildings”. AS 4420.1-6 Windows – Methods of Test.

All Australian Standards are as laid down by the S.A.A. (Standards Association of Australia) which maintains its Headquarters at, 1 The Crescent, Homebush N.S.W. 2140.

Test results reported herein are only those carried out by personnel and with equipment approved by N.A.T.A. and do not include tests carried out with any other equipment which may be utilised by Schlegel from time to time in their role as a specialist manufacturer of Weatherseal.

The ‘Approved’ or “Authorised Signatory” is the Schlegel employee approved by N.A.T.A. as a signatory of endorsed test results.

TESTING CAPABILITY

The Testing capacity of the Schlegel Mobile Testing Laboratory is as follows: -

Maximum Size - 3600mm wide x 2200mm high (mounted sample)
Maximum Pressure - 4000 pascals average (dependant on sample)
Standard Tests - As per AS2047 –1999. Deflection, Operating Force, Air Infiltration, Water Penetration & Ultimate Strength.



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TEST REPORT

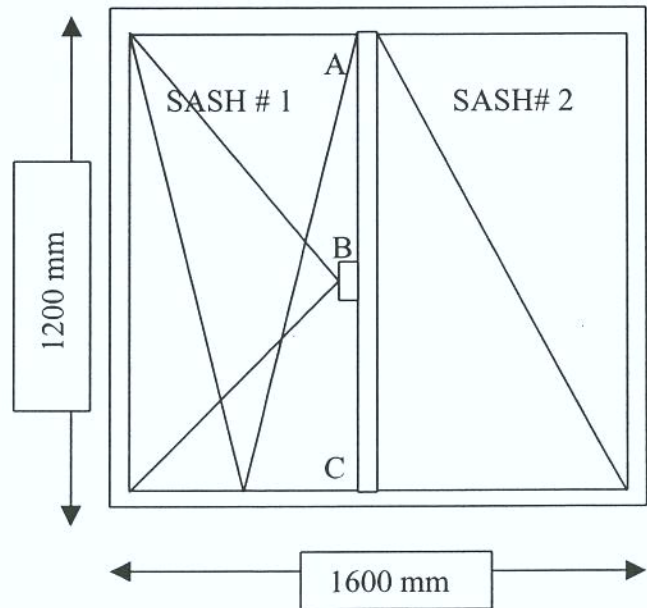


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DATE OF TEST: 03/03/04
LOCATION : CHIPPING NORTON
CLIENT: REHAU
DESCRIPTION OF SAMPLE: A PVCU WINDOW ASSEMBLY CONSISTING OF A RIGHT HAND TILT-TURN WINDOW SYSTEM AND ONE LEFT HAND FIXED SASH.
DRAWING NUMBER /ISSUE: LT861 CM03
 Copies of the above drawing are attached to, and form part of this report. The drawings are endorsed by the Client as regards the accuracy of representation of the details in relation to the sample submitted for test.
NOMINAL DIMENSIONS: 1200mm (H) x 1600mm (W)
GLAZING DETAIL: 6.38 mm LAM. SASH 1-2
WEATHERSEAL DETAIL: SEAL : EPDM

SCHEMATIC OUTLINE AND ARRANGEMENT (VIEW OF INDOOR FACE)



Deflection measurement points shown thus (A), (B), (C) etc.
 Span members shown thus : (1), (2), (3). Etc
 REFER AS 2047-1999
 REFER AS 4420.1 – 6 –1996

STANDARDS DETAIL:
 (When Applicable)

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METHODS OF TEST

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WINDOWS IN GENERAL

(RELATING TO TESTING COVERED BY THE ABOVE REFERENCE REPORT)

NOTE: "POSITIVE PRESSURES" : WIND LOAD : OUTDOOR TOWARDS INDOOR.

"NEGATIVE PRESSURES" : WIND DRAG : INDOOR TOWARDS OUTDOOR

STANDARDS REFERENCE TESTS (WHICH SHALL BE CARRIED OUT IN SPECIFIC ORDER - REFER STANDARD AS4420.0

AS 4420.1

1. OPERATE & PRE - LOADING:

The test sample shall be operable, i.e. 5 cycles of opening, closing and locking prior to testing. An initial pressure equivalent to 50% of either the positive or negative test pressure shall be applied and held for 1 min.

AS 4420.4

4. AIR INFILTRATION : Operation and pre-loading as described in As 4420.1 . The face of the test sample shall then be sealed airtight by covering it with an impervious film. If this is not practicable, all joints, weep-holes, and glazing or sealant lines of the test sample shall be sealed with impervious adhesive tape. Positive and negative test pressures shall then be applied and the base air infiltration rates through the test apparatus shall be determined by air-flow meter.. The sealing tape or film shall be removed from the test sample and the air infiltration rates determined. The air infiltration through the test sample shall be the difference between the base and total readings.

AS 4420.2

2. DEFLECTION : Differential pressures in the same direction shall then be applied across the test sample in not less than 4 approximately equal increments until the test pressure is reached. The pressure shall be held for at least 1 min at each pressure increment, and the readings of the displacement measuring devices recorded. The differential pressure shall be removed and after 2 min the zero displacement readings shall be taken. The process is then repeated using the opposite loading. The nett midspan is calculated to result in a ratio which is referred to a table of maximum allowable deflection ratios. This test is required in both Positive and Negative modes. Observations are recorded detailing any damage, distortion etc.

AS 4420.5

5. WATER PENETRATION : The test sample shall be subjected to water sprayed uniformly and continuously over the exterior face of the test sample at a rate of not less than .051 / sq. m / sec. At the start of the test, the water sprays shall operate for 5 min with zero air pressure differential on the test sample. The test pressure shall be applied and maintained for 15 min with the water sprays still operating. The pressure and water sprays shall then be removed. Any water appearing on the inside surfaces of the test sample, and its source, shall be noted and recorded.

AS 4420.3

3. OPERATING FORCE: With the window closed, but unlocked an operating force shall be applied, without shock, in the plane and direction of the sash operation. For both directions of sash travel, the following forces shall be noted and recorded:

- That capable of setting the sash in motion.
- That capable of maintaining the motion after the sash frame is clear of the perimeter frame of the sample.

Each sliding sash of the test sample shall be tested separately. For horizontally sliding sashes, the force shall be applied either at the position of a fixed handle, or at 1/3 of the height of the pull stile above the sill for continuous adjustable hand grips. For vertically sliding sashes, the forces shall be applied at the sash pulls or at the mid point of the bottom rail, or at a position nominated by the manufacturer.

AS 4420.6

6. ULTIMATE STRENGTH : The test sample shall be subjected to a smoothly increasing differential pressure up to the test pressure determined in AS 2047 -1999, conducted in both positive and negative directions. The time taken to reach the structural test pressure shall be approximately 1 min. Test pressure shall be maintained on the test sample for a period of 10 sec. If the sponsor requires incremental tests, each increment shall represent a separate test requiring 10-sec. duration. At the conclusion of the test at each loading, the test sample shall be inspected and any signs of damage or collapse of the test sample noted and recorded.

'Collapse' shall be as defined in AS 2047 - 1999.

THIS APPENDIX WAS PREPARED AND INCLUDED AS A REFERENCE SUMMARY ONLY AND IS NOT TO BE REGARDED AS ANY FORM OF REPLACEMENT OF THE RELEVANT STANDARDS.



TEST REPORT



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SUMMARY OF TEST RESULTS

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SEQUENCE OF TESTING	TEST	REQUIRED RESULT	ACHIEVED RESULT	PASS / FAIL COMMENT	REFER PAGE NO.
1	:DEFLECTION (POSITIVE)	SPAN / 250 Pascals 1500	SPAN / 604.230 Pascals 1500	PASS	6
2	:DEFLECTION (NEGATIVE)	SPAN / 250 Pascals 1500	SPAN / -561.798 Pascals 1500	PASS	6
3	:: OPERATING FORCE (INITIATING)	Newtons Per Total Sash	Newtons Per Total Sash	N/A	N/A
4	:: OPERATING FORCE (MAINTAINING)	Newtons Per Total Sash	Newtons Per Total Sash	N/A	N/A
5	AIR INFILTRATION (POSITIVE)	1 litres / sec m ² @ 75 Pascals	0.77 Litres / sec m ² @ 75 Pascals	PASS	7
6	AIR INFILTRATION (NEGATIVE)	1 litres / sec m ² @ 75 Pascals	0.69 Litres / sec m ² @ 75 Pascals	PASS	7
7	WATER PENETRATION	15 Minutes 200 Pascals	15 Minutes 300 Pascals	PASS	8
8	ULTIMATE (POSITIVE)	2300 Pascals	2300 Pascals	PASS	9
9	ULTIMATE (NEGATIVE)	2300 Pascals	2300 Pascals	PASS	9
M.T.L. TEST #	DRAWING #	DATE DRAWN	DRAWN BY	NO. OF PAGES	
1215	LT861 CM03	N/A	Hosin861	1	10

THE SAMPLE TESTED IS THEREFORE SUITABLE FOR:

1500 PASCAL DESIGN RATING
300 PASCAL WATER PENETRATION RATING
AIRCONDITIONED APPLICATION
HOUSING RATING - N4
REFER AS 2047-1999
REFER AS 4420.0-6-1996

: THE RESULT STATED IS RELEVANT TO THE MEMBER RECORDING THE GREATEST DEFLECTION.
:: THE RESULT STATED IS RELATIVE TO THE SASH OFFERING THE GREATEST RESISTANCE TO THE FORCE APPLIED.

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TEST REPORT



DEFLECTION TEST RESULTS

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M.T.L. REGISTER: 1215

AS 2047 – 1999

AS4420.2 - 1996

2.3.1.3 Deflection test

Window assemblies for housing shall be subjected to the deflection test in accordance with AS4420.2. The test pressure shall be the design wind pressure specified in table 2.1. No structural members in a completely assembled and glazed window shall deflect by an amount greater than span /150 when tested at the serviceability design wind pressure.

- (A) span/150 when tested at the serviceability design wind pressure; or
- (B) span/180 or 250 when tested at the serviceability limit state design wind pressure

7. Calculation of displacement / span ratio

Where a structural member of the test sample is effectively supported at its ends only, it's mid-span displacement and resultant displacement / span ratio under load shall be calculated as follows.

Net mid-span deflection – Average of net end deflections.

$$\text{Deflection Ratio} = \frac{\text{Net mid-span deflection} - \text{Average of net end deflections}}{\text{Span of member between points of Support}}$$

$$\text{DEFLECTION RATIO CALCULATION} = \left[B - \frac{[A + C]}{2} \right] / \frac{\text{SPAN}}{[\text{LENGTH}]} \times \frac{1}{X}$$

Member	Positive Pressure Applied					Negative Pressure Applied						
	Span	Pressure (Pascals)	Measured Deflection (mm)			Ratio	Span	Pressure (Pascals)	Measured Deflection (mm)			Ratio
			A	B (Centre)	C				A	B (Centre)	C	
No. 1	1000mm	900	0.77	1.79	0.68	938.967	900	-0.64	-1.78	-0.54	-840.336	
		1100	1.01	2.36	0.74	673.401	1100	-0.94	-2.11	-0.69	-772.201	
		1300	1.05	2.49	0.88	655.738	1300	-1.10	-2.52	-0.77	-630.915	
		1500	1.30	2.77	0.93	604.230	1500	-1.34	-2.97	-1.04	-561.798	
No. 2												
No. 3												

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TEST REPORT



AIR INFILTRATION TEST

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AS 2047 – 1999

AS4420.4 - 1996

5.2.1.5 Air Infiltration Test

Windows for housing shall be subjected to the air infiltration test in accordance with AS4420.4 and under either of the test pressures specified in Table 2.3. The air infiltration shall not exceed the amount given in Table 2.3.

Notes

The air infiltration shall not

- [A] 5 litres / sec m² @ 75 Pa and 8 litres / sec m² @ 150 Pa for non- – air-conditioned buildings.
- [B] 1 litres / sec m² @ 75 Pa and 1.6 litres / sec m² @ 150 Pa for air-conditioned buildings.
- [C] 20 litres / sec m² @ 75 Pa and 32 litres / sec m² @ 150 Pa for louvre windows.

Other:

Note:

TEST CONDITIONS

THE LEAKAGE FLOW RATE AS

DRY BULB TEMPERATURE : 27.00 Deg C

CALCULATED IS THAT WOULD BE

WET BULB TEMPERATURE : 24.00 Deg C

EXPECTED FOR AIR DENSITY 1.266Kg/m³

RELATIVE HUMIDITY : 77.00%

CORRESPONDING, APPROXIMATELY, TO

BAROMETER READING : 1030.00 Mbar

15°C AND 1013 MILLIBARS.

SAMPLE AREA (As 1.200 Height x 1.600 Width (metres)


$$= 1.920 \text{ m}^2$$

RESULTS	INWARDS PRESSURE (POSITIVE)		OUTWARDS PRESSURE *(NEGATIVE)
BASE LEAKAGE	3.585	$Q_B = k \sqrt{P_B}$ litres / sec	3.207
GROSS LEAKAGE	5.070	$Q_G = k \sqrt{P_G}$ litres / sec	4.535
NETT LEAKAGE	1.485	$Q_S = Q_G - Q_B$ litres / sec	1.328
RATE OF INFILTRATION	0.77	$\frac{Q_S}{A_S}$ (litres / sec m ²)	0.69

*Samples only for air-conditioned buildings

COMMENT: SAMPLE SUITABLE FOR AIR-CONDITIONED APPLICATIONS

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TEST REPORT



WATER PENETRATION RESISTANCE TEST

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AS 2047 – 1999

AS4420.4 - 1996

2.3.1.6 Water Penetration Resistance test

Windows for housing shall be subjected to the water penetration resistance test in accordance with Table 2.4. During and at the completion of the test there shall be no penetration of uncontrolled water beyond a plane extending parallel and flush with the interior face of the window frame. This plane is meant to signify the inner most extent of the window frame and water, with the exception of that defined in the notes below, that has passed this point is no longer controlled by the product and is likely to cause damage to property or concern to occupants.

Uncontrolled water is defined as –

- 'A' Water that is not contained in a purpose built containing drainage area; or
- 'B' Water that is likely to wet insulation, fixtures and finishes, reveal linings or window furnishings beyond the window frame.

Notes:

1. Window sill tracks and thresholds, which are part of a drainage system that allows water to flow to the outside of the product at cessation of the test, are regarded as purpose built drainage areas.
2. Minor splashing due to air infiltration during change of pressure is not deemed a failure.
3. Water appearing upon the interior face of the window that is, or is likely to be, contained within a purpose built drainage area is not deemed a failure providing it is droplets or intermittent flow. Constant streams would be regarded as a failure.
4. At the completion of the test, water that lies on transoms, rails, sills etc., with the exception of minor splashing (see Note 2), that has no method of escape to the outside of the product via the drainage system will have deemed to fail the test.

SAMPLE AREA As 1.200 Height x 1.600 Width (metres)
 = 1.920 m²

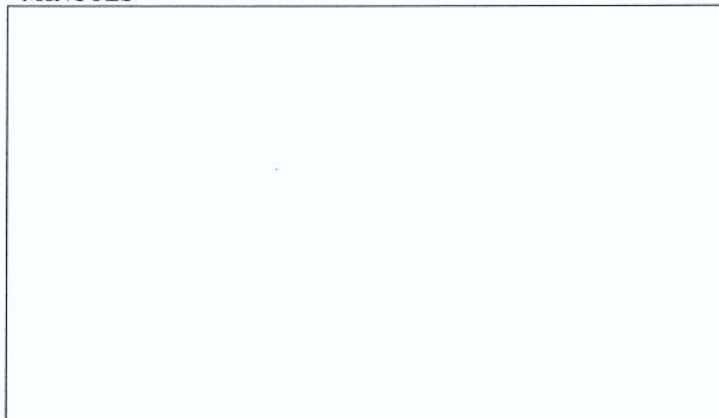
WATER FLOW RATE REQUIRED – 0.05 x L / m² . sec

TOTAL WATER FLOW REQUIRED – 0.05 x Sample Area
 = 0.05 x 1.920 m²
 = 0.096 L / m² . sec

AIR PRESSURE (POSITIVE) APPLIED – 150 Pascals minimum

DURATION OF TEST – 15 MINUTES

STANDARDS AS4420.5 PROCEDURE 6.2 REQUIRE 15 MINUTES



SAMPLE VIEWED FROM INDOOR FACE

RESULT :

PASSED @ 300 PASCALS

Nil water ingress beyond the interior face of the sample for the duration of the test. Note: Sample achieved 150pa. for 15min. prior to achieving 300pa. water penetration test result. Seal : EPDM
 2 drainage weep holes
 5mmx20mm

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TEST REPORT



ULTIMATE STRENGTH TEST

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AS 2047 – 1999

AS4420.6 - 1996

2.3.1.7 Ultimate Strength

Windows for housing shall not collapse when subjected to the ultimate strength test in accordance with AS4420.6. 'Collapse' shall mean any one, or any combination, of the following:

- (A) Dislodgment of any glass.
- (B) Dislodgment of a frame or any part of a frame.
- (C) Removal of a light, either with or without its framing sash, from a frame
- (D) Loss of a support frame, such as when it is unstable in its opening in the building structure.
- (E) Failure of any sash, locking device, fastener or supporting stay, allowing an opening light to open.

The test pressure shall not be less than the value given in Table 2.5.



SAMPLE VIEWED FROM INDOOR FACE

RESULT :

PASSED @ 2300 PASCALS

DESIGN RATING:

1500 PASCALS

NON COLLAPSE:

NIL COLLAPSE

POSITIVE PRESSURE:

2300 PASCALS PASS

NEGATIVE PRESSURE:

2300 PASCALS PASS

COLLAPSE

NIL COLLAPSE

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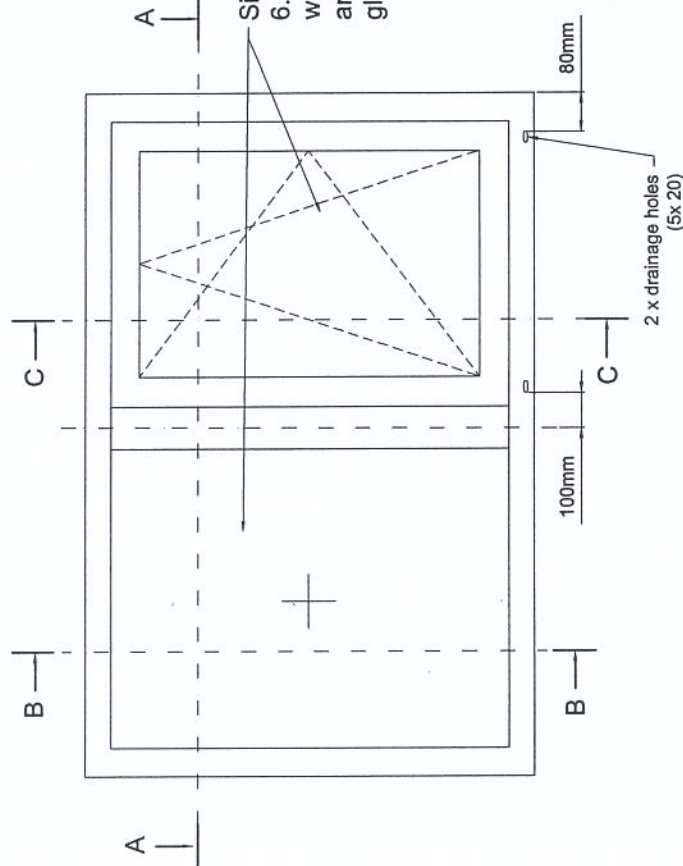
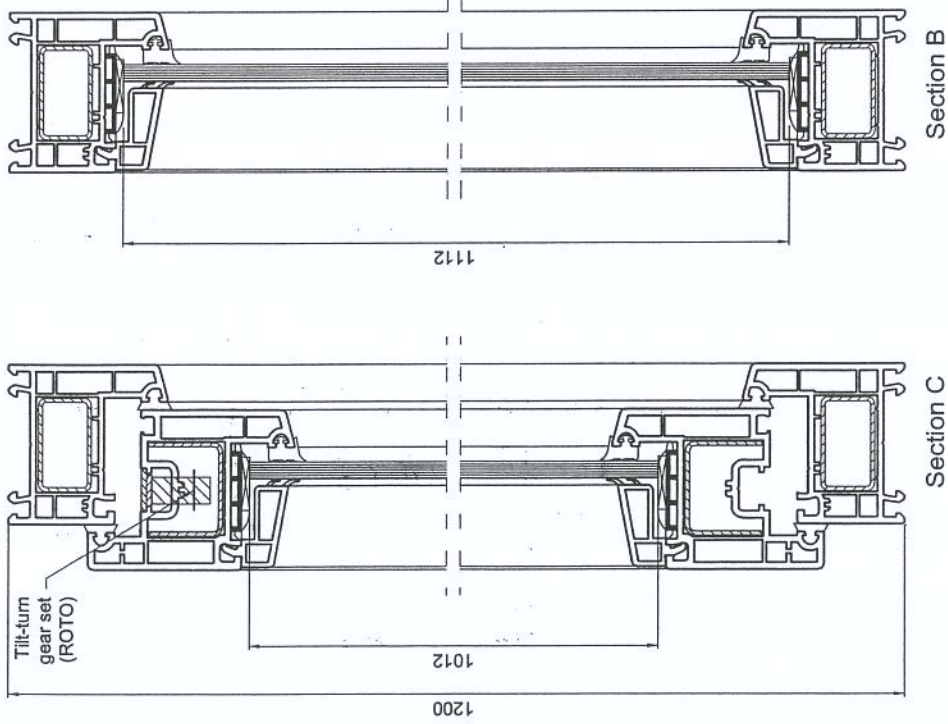
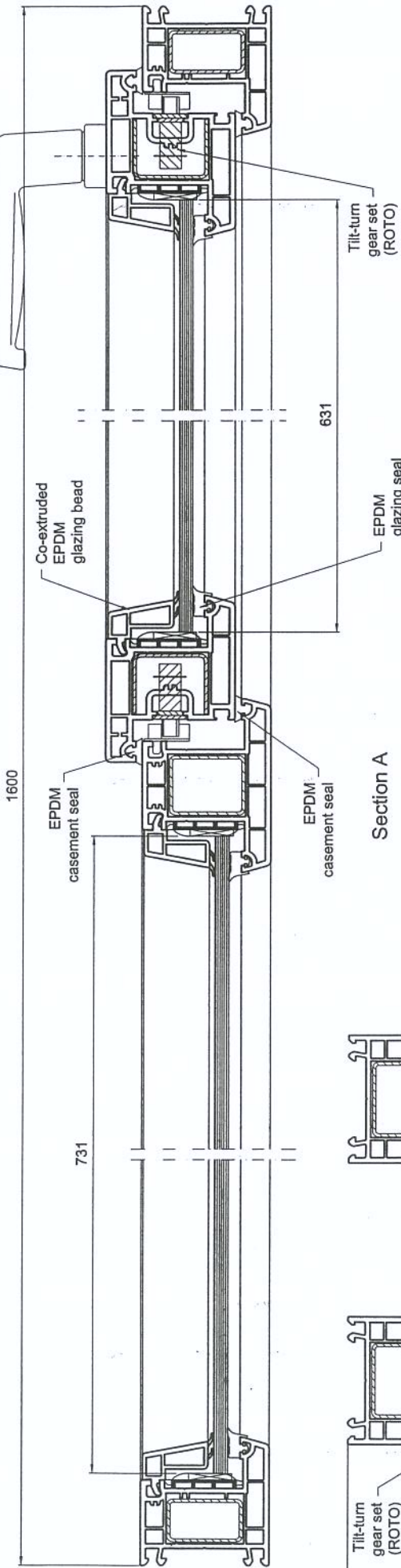

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REHAU

S921
Prestige-Design

Scale: M 1 : 2
Drawn by: HOsin861
Dwg No.: LT861 CM03

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Single glazed glass
6.38 laminated
with EPDM glazing seals
and co-extruded EPDM
glazing bead

View from outside

SCHLEGEL™ Pressure Conversion Chart



Pascals	m/sec.	Km/hr	mmH ₂ O	MPH	Psf
75	11.18	40.25	7.65	25.01	1.56
100	12.91	46.48	10.20	28.88	2.08
150	15.81	56.92	15.30	35.36	3.13
200	18.26	65.73	20.40	40.84	4.17
250	20.41	73.48	25.50	45.88	5.22
300	22.36	80.50	30.60	50.02	6.26
400	25.82	92.95	40.80	57.75	8.35
500	28.87	103.92	51.00	64.57	10.44
600	31.62	113.84	61.20	70.73	12.53
700	34.16	122.69	71.40	76.23	14.62
800	36.51	131.45	81.60	81.67	16.71
900	38.73	139.43	91.80	86.63	18.80
1000	40.82	146.97	102.00	91.32	20.89
1100	42.82	154.14	112.20	95.77	22.97
1200	44.72	161.00	122.40	100.04	25.06
1300	46.55	167.57	132.60	104.12	27.15
1400	48.30	173.90	142.80	108.05	29.24
1500	50.00	180.00	153.00	111.84	31.33
1600	51.64	185.90	163.20	115.51	33.42
1700	53.23	191.62	173.40	119.06	35.51
1800	54.77	197.18	183.60	122.52	37.60
1900	56.27	202.58	193.80	125.87	39.69
2000	57.74	207.85	204.00	129.15	41.78
2100	59.16	212.98	214.20	132.33	43.86
2200	60.55	218.00	224.40	135.45	45.95
2300	61.91	222.90	234.60	138.50	48.04
2400	63.25	227.68	244.80	141.47	50.13
2500	64.55	232.38	255.00	144.39	52.22
3000	70.71	254.56	306.00	158.17	62.67
4000	81.65	293.94	408.00	182.64	83.56
5000	91.29	328.63	510.00	204.20	104.45
6000	100.00	360.00	612.00	223.69	125.34

SCHLEGEL PTY. LIMITED ABN 27 000 419 876

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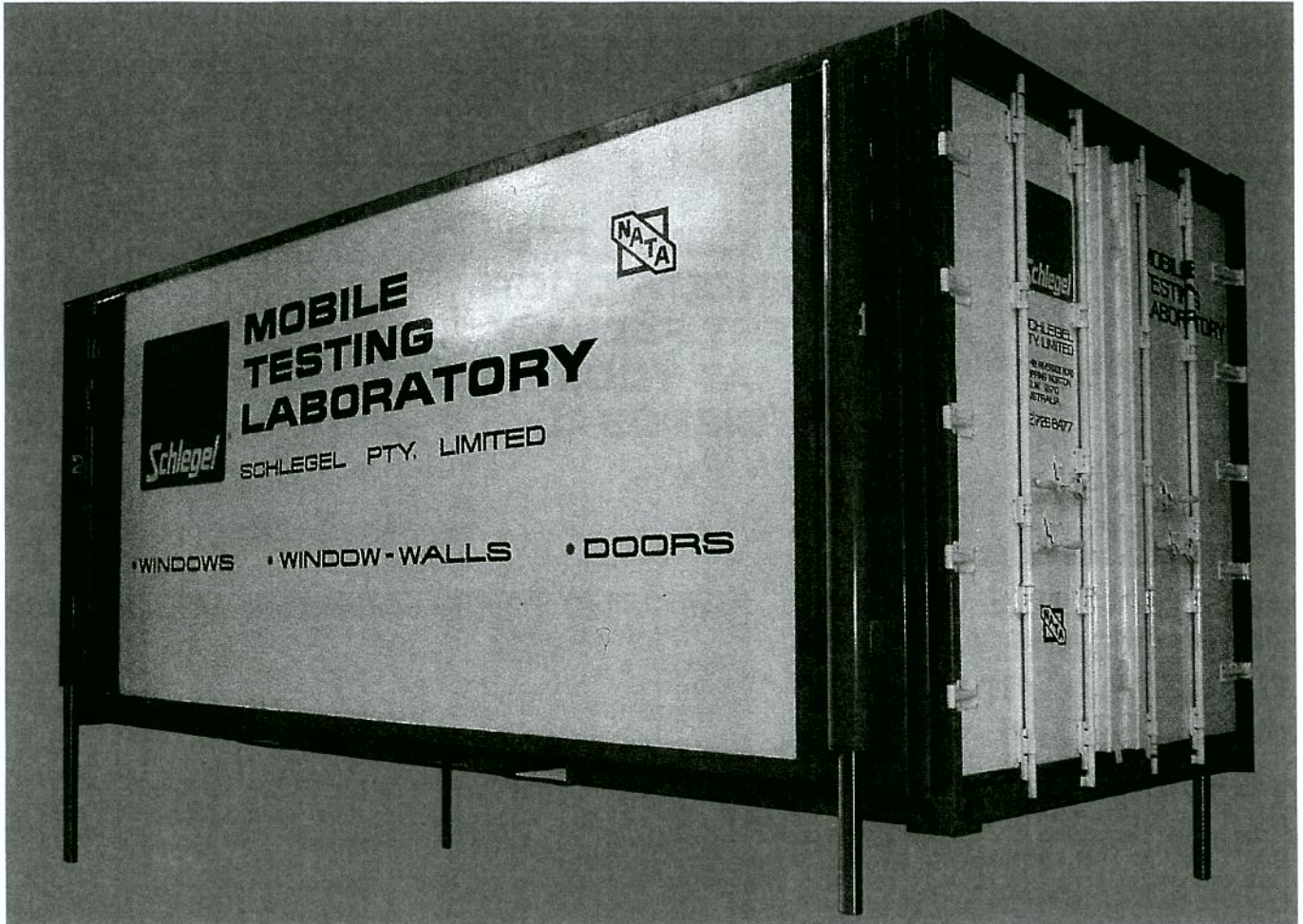
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SCHLEGEL™ Mobile Testing Laboratory



MOBILE TESTING LABORATORY



Schlegel Pty Limited, Australia's first manufacturer of woven-pile weatherseal have continually led the market with new innovations in the area of weathersealing.

In 1983 we implemented another first in the industry, the commissioning of Australia's first Mobile Window and Door Testing Laboratory.

Not just an expensive promotional toy, the Schlegel Mobile Testing Laboratory is a fully accredited and totally functioning

mechanical testing facility for the use of fabricators and manufacturers around Australia.

The Mobile Testing Laboratory is able to carry out all tests laid

down by the relevant standards and, in addition, can produce cyclic wind gusting, which was another first in this country.

In its first tour of operation the unit covered 14,000 kilometres

around the continent from Gympie in Queensland, to Perth in Western Australia.

The Mobile Testing Laboratory is now continuously serving the industry by providing a world class facility to anyone involved in the development of better windows, doors and window-walls.



WHEREVER YOU ARE!!!