BM TRADA

Acoustic Test Report

Sponsor:
Senior Architectural Systems Ltd
Eland Road
Denaby Main
Doncaster
DN12 4HA

CONFIDENTIAL

Report: BMT/MTP/F15147/02

Report on the testing of a aluminium curtain walling for acoustic performance to BS EN ISO 10140-2:2010

Issue date: September 2015

1762

Contents

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1 Introduction

The test specimen was supplied by the sponsor and delivered to BM TRADA on 5 June 2015. The specimen was installed into a timber stud partition within the test chamber by BM TRADA.

Test Details

The specimen was tested to BS EN ISO 10140-2:2010 Acoustics - Laboratory measurement of sound insulation of building elements. Measurement of airborne sound insulation

Testing was conducted at BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley, Buckinghamshire. HP14 4ND on the 14th July 2015.

For details of the testing, please see Section 3, Methodology.

Supporting Construction Description

The partition consisted of two wall leaves separated by a 150mm air gap. Each wall leaf was constructed of nominal 45mm x 90mm softwood studs at 600mm centres with two layers of 15mm plasterboard on each face. The stud wall cavities were filled with 100mm thick Rockwool insulation.

2 Test Specimen Details

Product Name	SF52
Product Type	Curtain Walling
Material Type	Aluminium
Overall Dimensions	850mm wide x 2110mm high x 180mm deep

Framing

	Material/type	Dimensions (mm)
Mullion / Transom	Senior Architectural Systems aluminium profile (Ref. SF100P)* *See Appendix 1 Figure 1*	100 x 52
Pressure plate	Senior Architectural Systems aluminium profile (Ref. SF260F)* fixed with 4.5mm x 68mm pressure plate screws (Ref. SFSHS4868)* *See Appendix 1 Figure 2*	48 wide
Mullion clip on cap	Senior Architectural Systems aluminium profile (Ref. SCW002P)* clipped onto pressure plates *See Appendix 1 Figure 2*	17 x 50
Transom clip on cap	Senior Architectural Systems aluminium profile (Ref. SCW003P)* clipped onto pressure plates *See Appendix 1 Figure 2*	15 x 50
Thermal break	Senior Architectural Systems (Ref. SF429)* *See Appendix 1 Figure 3*	47.5 x 10
Joints & bracketry	*See Appendix 1 Figure 4*	-
Cleats	Senior Arcitectural Systems front loaded cleat (Ref. SF500)* fixed with 1No. 10 x 19 screw (Ref. SFSCS10X19)* *See Appendix 1 Figure 5*	-
	Senior Arcitectural Systems spring pin assembly cleat (Ref. SF501)* *See Appendix 1 Figure 5*	-
Drainage spout	2No. Senior Architectural Systems (Ref. SF532)* *See Appendix 1 Figure 5*	10 x 56
End dam	2No. transom end dam (Ref. SF522)* *See Appendix 1 Figure 6*	43 x 48

* As stated by sponsor, not checked by laboratory

Perimeter Sealing Details

	Make/type	Size (mm)	Location
Frame reveal	2No. Senior Architectural Systems (Ref. SF460)* *See Appendix 1 Figure 7*	61 x 21 x 2110	Fixed to perimeter of framing mullions
	2No. Senior Architectural Systems (Ref. SF460)* *See Appendix 1 Figure 7*	61 x 21 x 850	Fixed to perimeter of transoms
	Senior Architectural Systems mullion sleeve (Ref. SF101250)* *See Appendix 1 Figure 8*	45 x 87.5 x 250	2No. at head and 2No. at base
	Senior Architectural Systems fixing bracket plate (Ref. SFFBSP)* *See Appendix 1 Figure 8*	10 x 200 x 250	2No. at head and 2No. at base
Seal continuity	Uninterrupted	-	-

* As stated by sponsor, not checked by laboratory

Glazing

		Make/type/size (mm)	(dimensions in mm)
Glass type and configuration		8.8 Planitherm Ultra Silence / 10 spacer / 6 toughened Ultra 'N' / 10 spacer / 12.8 Ultra Silence	-
Overall size	**Top**	776 wide x 862 high	-
	Bottom	776 wide x 1152 high	-
Sight size	**Top**	744 wide x 832 high	-
	Bottom	744 wide x 1120 high	-
Bead		Retained by pressure plate	-
Packers		1No. Senior Architectural Systems 22 x 2 setting blocks (Ref. SGP22X2MM)*	Bottom transom only
		1No. Senior Architectural Systems 30 x 2 setting blocks (Ref. SGP30X2MM)*	Bottom transom only
Gaskets		Senior Architectural Systems internal gasket (Ref. SF402)*	Between glass and frame
		Senior Architectural Systems internal moulded corner gasket (Ref. SF452)*	Between glass and frame
		2No. Senior Architectural Systems pressure plate gasket (Ref. SF410)*	Between glass and pressure plate
Glass support		4No. Senior Architectural Systems (Ref. SF285F)* 52 x 100 *See Appendix 1 Figure 9*	Bottom transom only
Sealants		Tremco Illbruck (Ref. OT015)*	Gasket to gasket To retain packers

*As stated by sponsor, not checked by laboratory

3 Methodology

Airborne Sound Insulation Test

- The loudspeakers were placed in the corners of the source room
- The sound level meter was calibrated prior to testing.
- 5 measurements were taken in the source room, at fixed positions.
- 5 measurements were taken in the receive room at fixed positions.
- Background measurements were taking at each third octave frequency between 50Hz and 5000Hz.
- 6 Reverberation measurements were taken in the receive room, in accordance with BS EN ISO 3382-2:2008 interrupted, engineering method.
- Calculations, including C & C_{tr}, were carried out in accordance with BS EN ISO 717-1

- The sound reduction index was calculated using the following formula from BS EN ISO 10140-2:2010:

$$R_w = L1 - L2 + 10Log\left(\frac{S}{A}\right)\ dB$$

Where:

L1 is the logarithmic average of the source room measurements
L2 is the logarithmic average of the receive room measurements
S is the area of the test specimen
A is the equivalent absorption area, where $A = \frac{0.16V}{T}$

Where:

V = The volume of the receive room
T = the reverberation time measured in seconds

1. Logarithmic average of 5 Measurements (L1 & L2)
2. Deduction of L1s from L2s
3. Area of test specimen (S) divided by equivalent sound absorption area (A)
4. Weighted Final Result R_w dB

Test Equipment

Equipment	Equipment reference number
Bruel & Kjear Sound Level Meter (Type 2270)	ACT-009
Bruel & Kjear Microphones (Type 4189)	ACT-010 & ACT-016
Bruel & Kjear Calibrator (Type 4231)	ACT-011
Amplifiers	ACT-007 & ACT-049
Noise Generators	ACT-008 & ACT-009
Loudspeakers (EV ZX1-90PA)	ACT-006, ACT-021, ACT-022
Graphic Equaliser (DBX Dual Channel)	ACT-023

4 Parameters & Limitations

Parameters

The test fulfilled all criteria required of ISO 10140-2, including:

- Sound level meter (microphone) was located as required
- Sound sources (loudspeakers) were located as required
- Reverberation Time readings were greater than 20dB but not so large that the observed decay cannot be represented by a straight line.
- Background noise measurements were 10dB below L2 measurements.
- Temperature was reported to within ± 0.1°C
- Barometric pressure was reported to within ± 0.01 Mbar (±1 Pa)
- Humidity was reported to within ± 1%
- Frequencies 50Hz, 63Hz and 80Hz are outside of our UKAS accreditation, and are for reference only. These frequencies do not affect the over R_w figure.
- R'_{max} of the test chambers was measured to be 65dB
- The test chambers are two cuboid rooms 5.49m wide and a ceiling height of 2.58m, volumes of chambers for testing are reported with the individual test data

Limitations

- The results only relate to the behaviour of the specimen submitted for test, as described in the Technical Specification (Section 2), and under the particular conditions of test.
- The results are not intended to be the sole criteria for assessing the acoustic performance of the element in use nor do they necessarily reflect the actual behaviour once installed on site.
- The specification and interpretation of test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. BM TRADA will be able to offer a review of the procedures adopted for a particular test to ensure that they are consistent with current practices.
- The results are solely for use by the sponsor and the stated purpose.
- The sponsor cannot rely on information provided without consent from BM TRADA.
- Any recommendations are specific to the assignment and the sponsor.
- Extracts from the report are not permitted.

5 Authorisation

	Issued by:	**Authorised by:**
Signature:		
Name:	Martin Durham	Lee Grant-Riach
Title:	Lead Technical Officer	Technical Officer
Date of Issue	3rd September 2015	

Appendix 1 – Summary of Results & Test Data Sheets (1 Page)

Datasheet Ref.	Product Details		Test Result R_w ($C;C_{tr}$)
MTP/F15147/02/P029	**Product Name**	SFS52	46 (-1;-6) dB
	Product Type	Aluminium Curtain Walling	

BMTRADA

Laboratory measurement to BS EN ISO 10140-2 - Airborne Sound Insulation of

1762

Sponsor:	**Senior Architectural Systems Ltd**
Product Name	**SF52**
Product Type	Curtain Walling
Material Type	Aluminium
Variations:	None

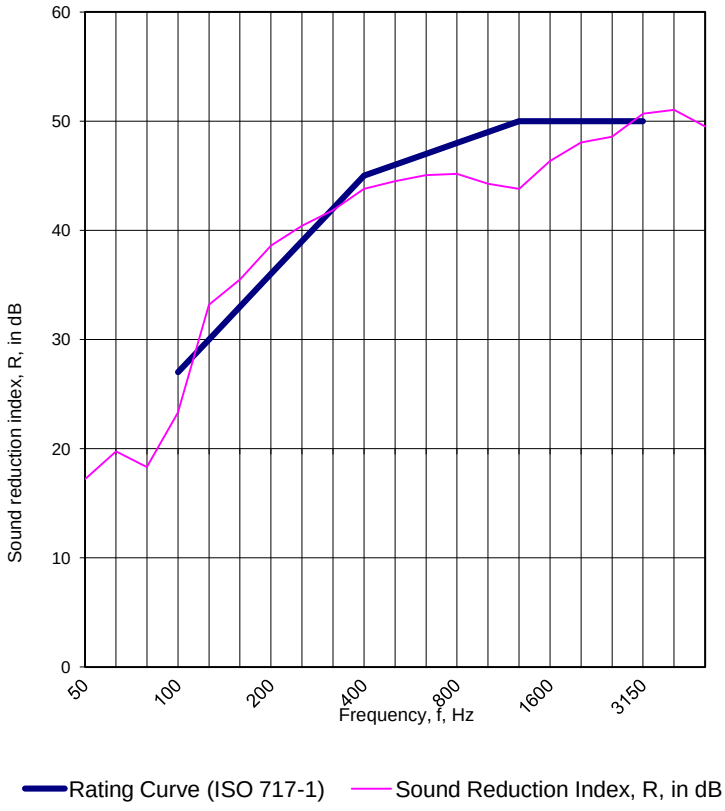
For detailed technical specification, please refer to Section 2 of the report

Data Sheet Ref. MTP/F15147/02/P029
Date of Test: 14/07/2015

Source Room Volume:	77.30 m^3
Receive Room Volume:	71.30 m^3
Specimen Installed By:	Client
Area of Specimen (S):	1.80 m^2
Temp. in Test Rooms:	17.0 °C
Static Pressure:	101670.0 Pa
Humidity in Test Rooms:	60.0 %

f, Hz	R ,dB	
50+		17.2
63+		19.8
80+		18.3
100		23.3
125		33.2
160		35.5
200		38.6
250		40.4
315		41.8
400		43.8
500		44.5
630		45.1
800		45.2
1000		44.3
1250		43.8
1600		46.3
2000		48.1
2500		48.6
3150		50.7
4000		51.0
5000		49.5
AAD		-29.3

Frequency range for rating in accordance with ISO 717-1



R_w =	**46 dB**
R_w+C =	**45 dB**
R_w+C_{tr} =	**40 dB**

$C_{(50-3150)}$ =	-2	dB	$C_{tr\ (50-3150)}$ =	-11	dB
$C_{(50-5000)}$ =	-2	dB	$C_{tr\ (50-5000)}$ =	-11	dB
$C_{(100-5000)}$ =	0	dB	$C_{tr\ (100-5000)}$ =	-6	dB

Martin Durham
Lead Technical Officer

+ indicates that the frequency is outside of our UKAS accreditation and is for information only

Appendix 2 – Sponsor's Drawings List

Figure Number	Description of Drawing
1	Mullions / Transoms
2	Caps and Pressure Plates
3	Thermal Breaks
4	Expansion Joints & Bracketry – Spout Drained
5	Accessories – Spring Pin, Transom Cleats, Spouts & JIgs
6	Accessories – End Dams & Sealant
7	Accessories – Gaskets, Corner Gaskets, EPDM & Cap Accessories
8	Accessories – Mullion Spigots
9	Installation – Glass Packing & Fitting

Drawings not verified by BM TRADA

Figure 1

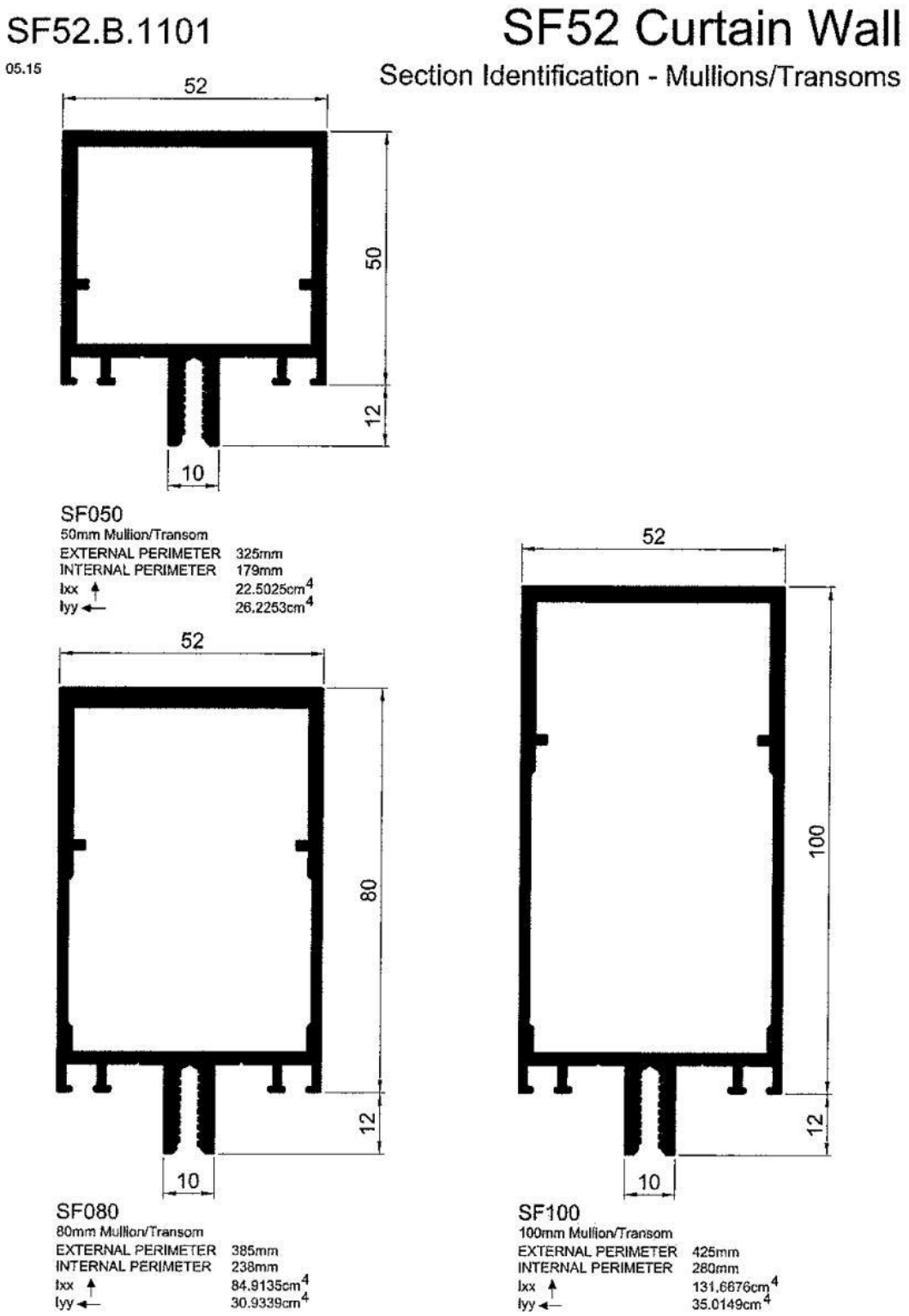

SF52.B.1101
05.15
SF52 Curtain Wall
Section Identification - Mullions/Transoms
52
50
12
10
SF050
50mm Mullion/Transom
EXTERNAL PERIMETER 325mm
INTERNAL PERIMETER 179mm
Ixx 22.5025cm4
Iyy 26.2253cm4
52
80
12
10
SF080
80mm Mullion/Transom
EXTERNAL PERIMETER 385mm
INTERNAL PERIMETER 238mm
Ixx 84.9135cm4
Iyy 30.9339cm4
52
100
12
10
SF100
100mm Mullion/Transom
EXTERNAL PERIMETER 425mm
INTERNAL PERIMETER 280mm
Ixx 131.6676cm4
Iyy 35.0149cm4

Figure 2

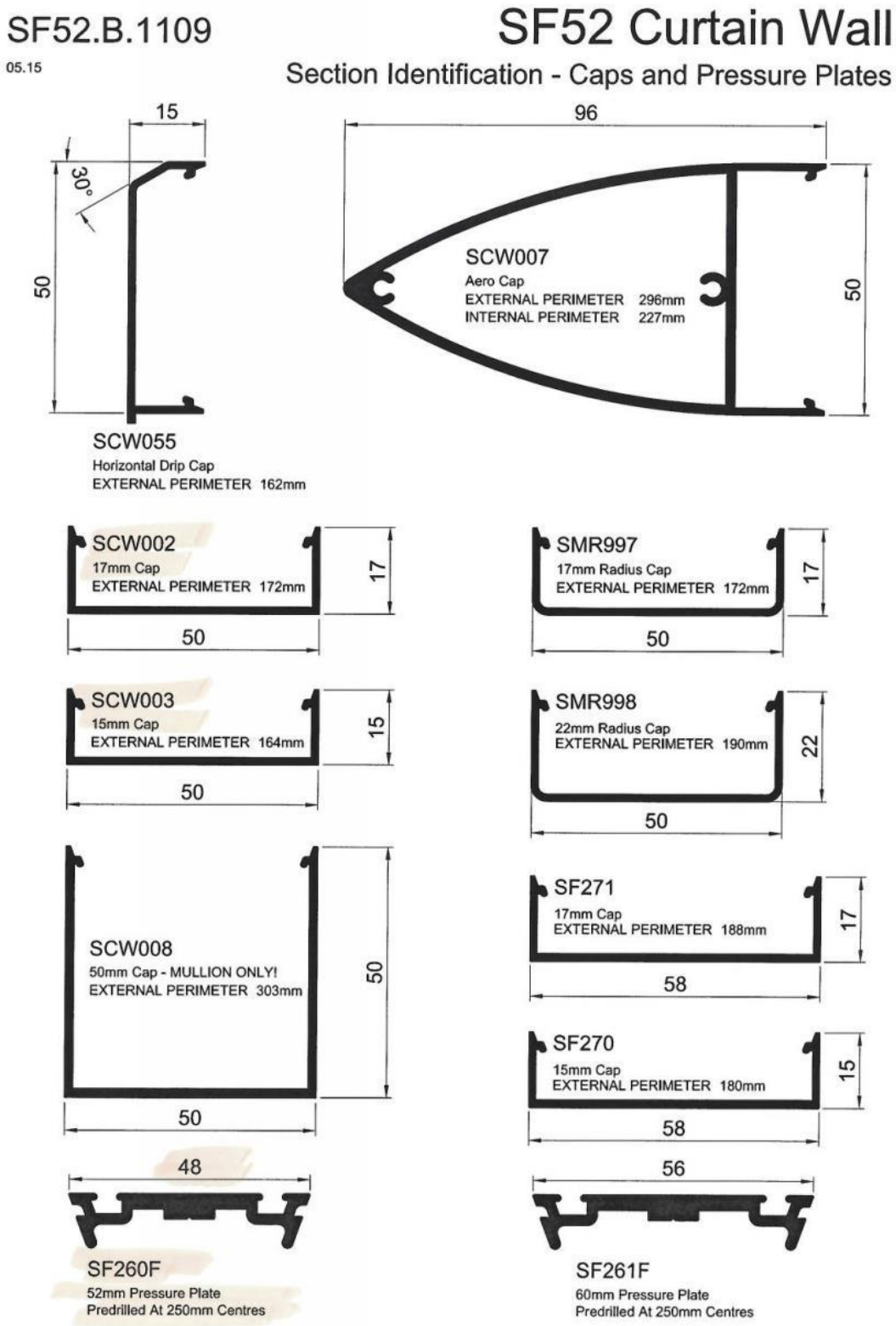

SF52.B.1109
05.15
SF52 Curtain Wall
Section Identification - Caps and Pressure Plates
15
30°
50
SCW055
Horizontal Drip Cap
EXTERNAL PERIMETER 162mm
96
SCW007
Aero Cap
EXTERNAL PERIMETER 296mm
INTERNAL PERIMETER 227mm
50
SCW002
17mm Cap
EXTERNAL PERIMETER 172mm
17
50
SMR997
17mm Radius Cap
EXTERNAL PERIMETER 172mm
17
50
SCW003
15mm Cap
EXTERNAL PERIMETER 164mm
15
50
SMR998
22mm Radius Cap
EXTERNAL PERIMETER 190mm
22
50
SCW008
50mm Cap - MULLION ONLY!
EXTERNAL PERIMETER 303mm
50
50
SF271
17mm Cap
EXTERNAL PERIMETER 188mm
17
58
SF270
15mm Cap
EXTERNAL PERIMETER 180mm
15
58
48
SF260F
52mm Pressure Plate
Predrilled At 250mm Centres
56
SF261F
60mm Pressure Plate
Predrilled At 250mm Centres

Figure 3

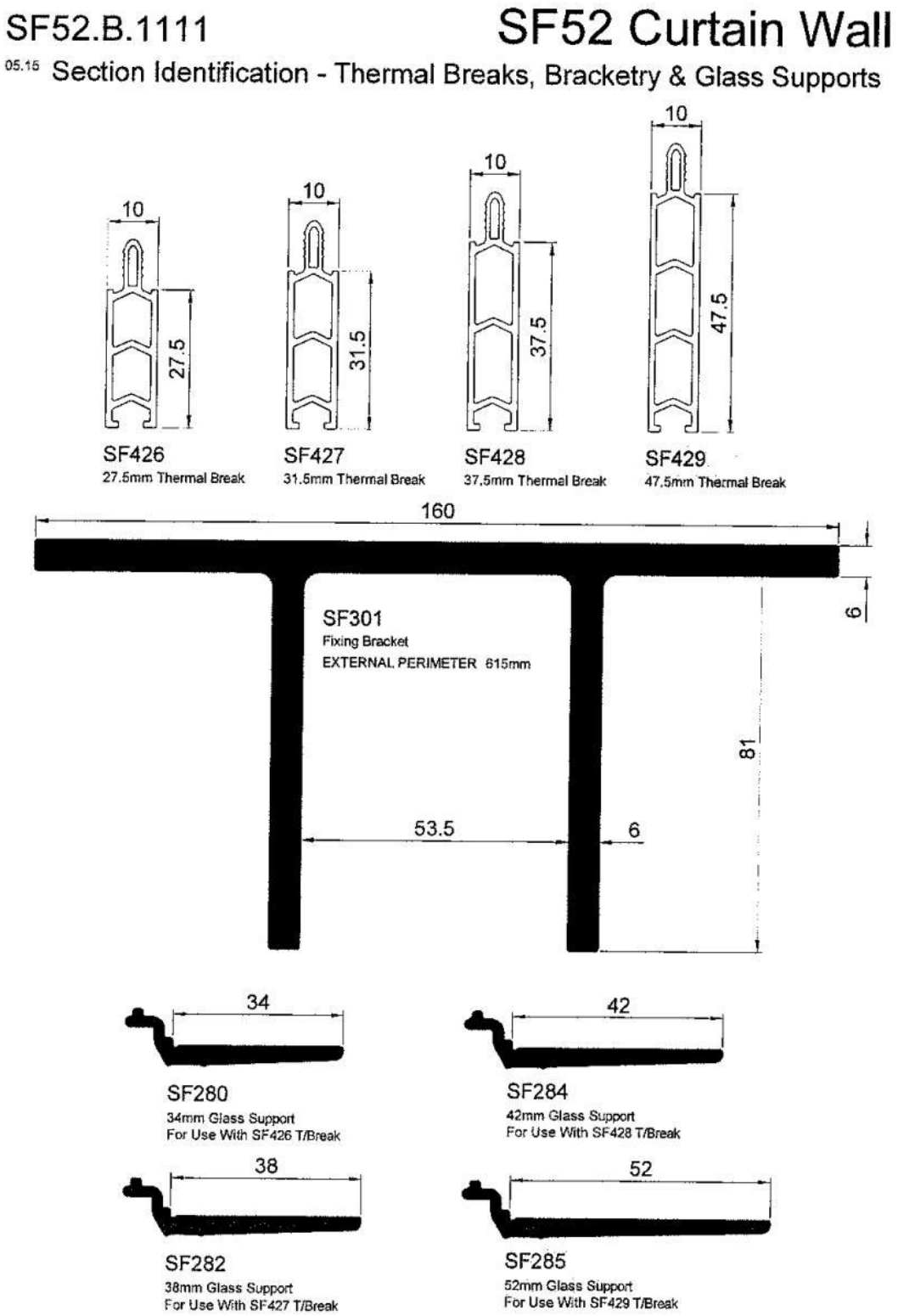

SF52.B.1111
SF52 Curtain Wall
05.15 Section Identification - Thermal Breaks, Bracketry & Glass Supports
10
27.5
SF426
27.5mm Thermal Break
10
31.5
SF427
31.5mm Thermal Break
10
37.5
SF428
37.5mm Thermal Break
10
47.5
SF429
47.5mm Thermal Break
160
6
SF301
Fixing Bracket
EXTERNAL PERIMETER 615mm
81
53.5
6
34
SF280
34mm Glass Support
For Use With SF426 T/Break
42
SF284
42mm Glass Support
For Use With SF428 T/Break
38
SF282
38mm Glass Support
For Use With SF427 T/Break
52
SF285
52mm Glass Support
For Use With SF429 T/Break

Figure 4

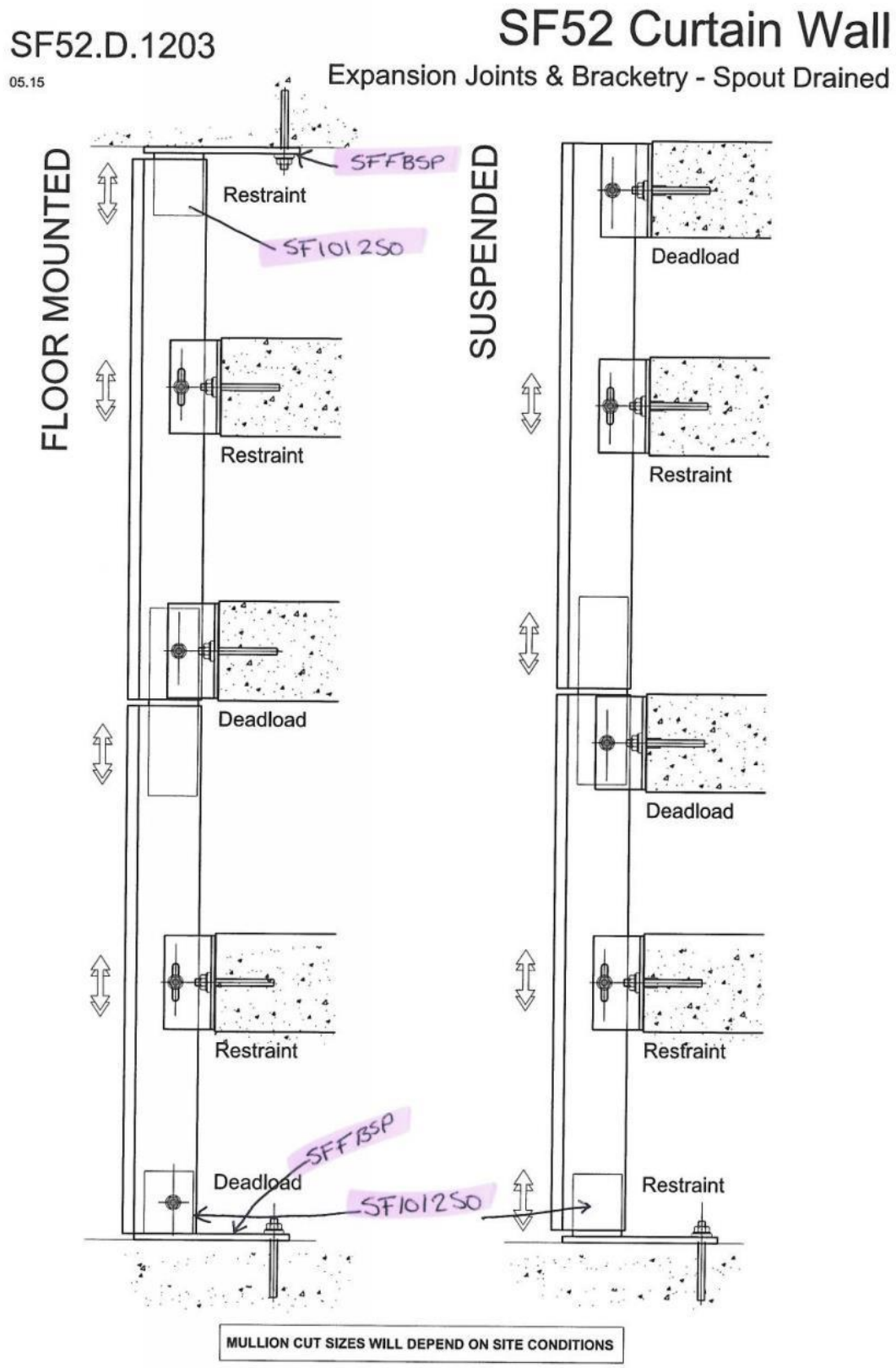

SF52.D.1203
05.15
SF52 Curtain Wall
Expansion Joints & Bracketry - Spout Drained
FLOOR MOUNTED
SUSPENDED
SFFBSP
Restraint
SF101250
Deadload
Restraint
Restraint
Deadload
Deadload
Restraint
Resfraint
SFFBSP
Deadload
SF101250
Restraint
MULLION CUT SIZES WILL DEPEND ON SITE CONDITIONS

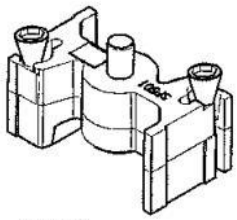
Figure 5

SF52 Curtain Wall

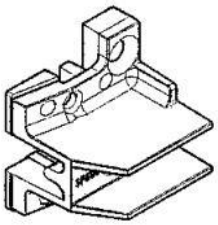
SF52.C.1102

Accessories - Spring Pin, Transom Cleats, Spouts & Jigs

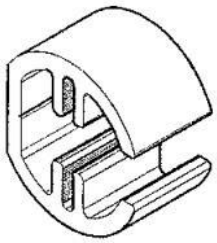
05.15



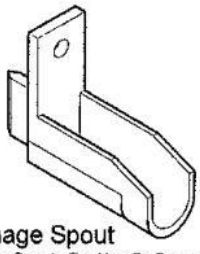
SF501
Spring Pin Cleat



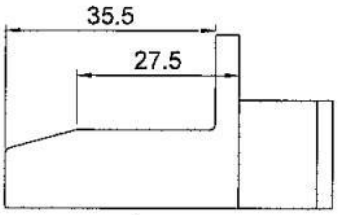
SF500
Transom Cleat



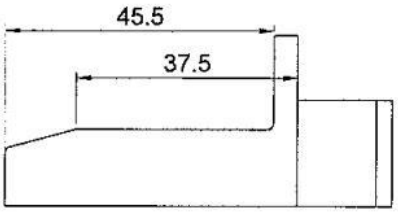
SF300CUT1
"C" Cleat Cut & Drilled



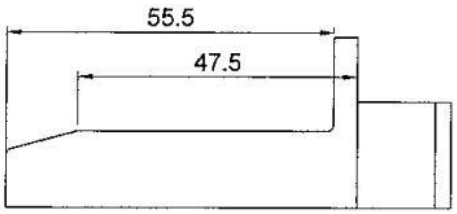
Drainage Spout
Drainage Spouts For Use On Spout Drained System



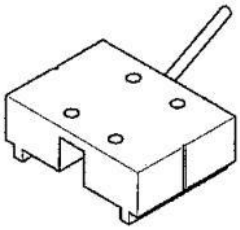
SF530
27.5mm Drainage Spout For Use With SF426 & SF427 Thermal Break



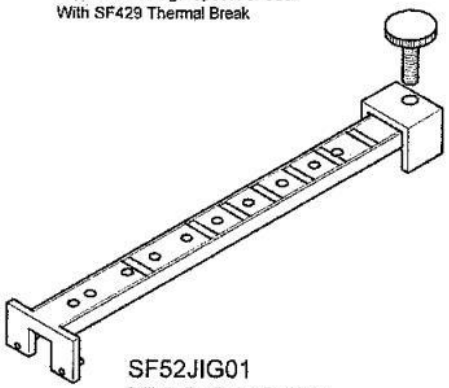
SF531
37.5mm Drainage Spout For Use With SF428 Thermal Break



SF532
47.5mm Drainage Spout For Use With SF429 Thermal Break



SF52JIG02
Drill Jig For SF500 Mullion Holes.



SF52JIG01
Drill Jig For Spring Pin Holes.

Figure 6

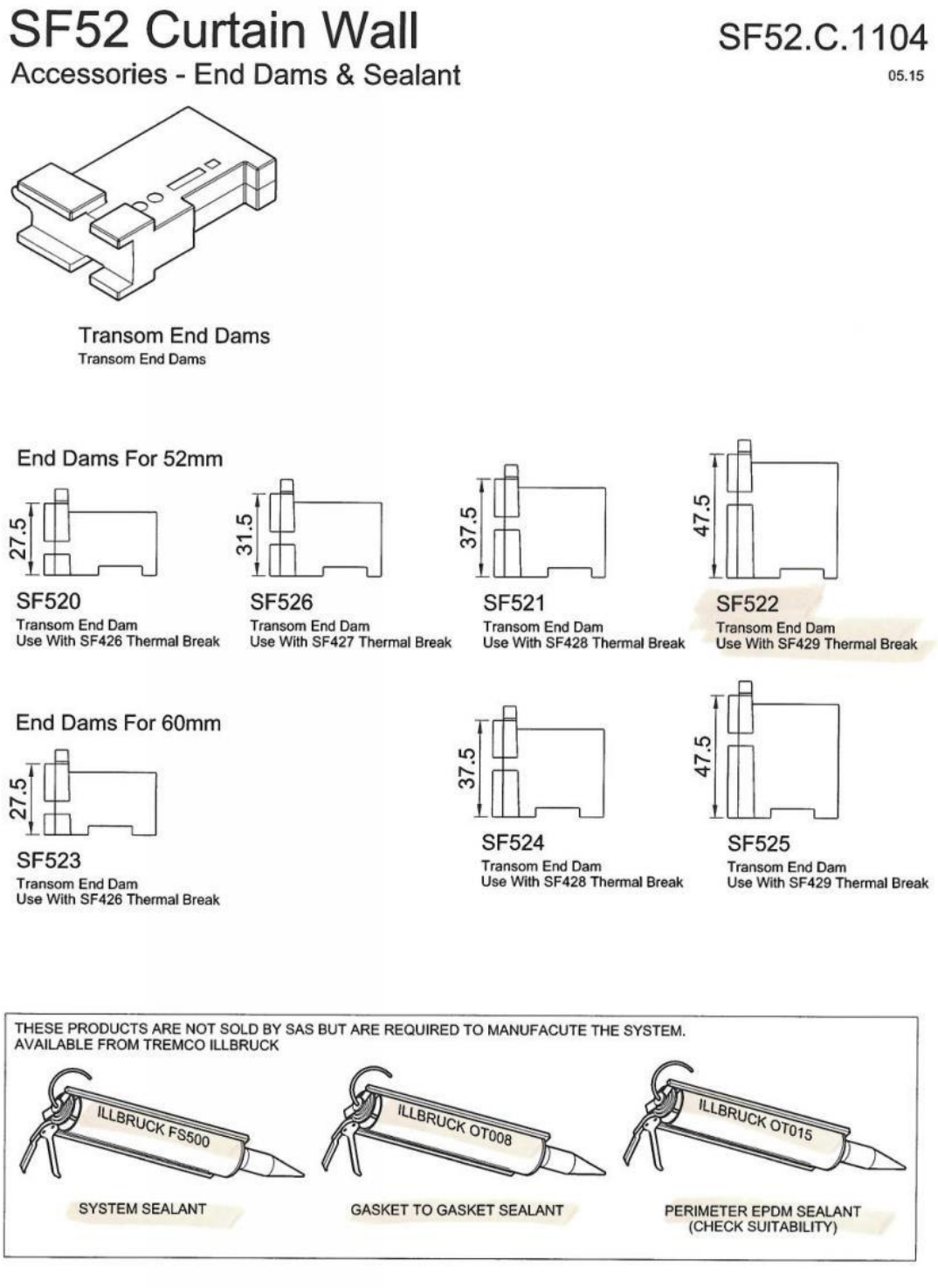

SF52 Curtain Wall
Accessories - End Dams & Sealant
SF52.C.1104
05.15
Transom End Dams
Transom End Dams
End Dams For 52mm
27.5
SF520
Transom End Dam
Use With SF426 Thermal Break
31.5
SF526
Transom End Dam
Use With SF427 Thermal Break
37.5
SF521
Transom End Dam
Use With SF428 Thermal Break
47.5
SF522
Transom End Dam
Use With SF429 Thermal Break
End Dams For 60mm
27.5
SF523
Transom End Dam
Use With SF426 Thermal Break
37.5
SF524
Transom End Dam
Use With SF428 Thermal Break
47.5
SF525
Transom End Dam
Use With SF429 Thermal Break
THESE PRODUCTS ARE NOT SOLD BY SAS BUT ARE REQUIRED TO MANUFACUTE THE SYSTEM.
AVAILABLE FROM TREMCO ILLBRUCK
ILLBRUCK FS500
SYSTEM SEALANT
ILLBRUCK OT008
GASKET TO GASKET SEALANT
ILLBRUCK OT015
PERIMETER EPDM SEALANT
(CHECK SUITABILITY)

Figure 7

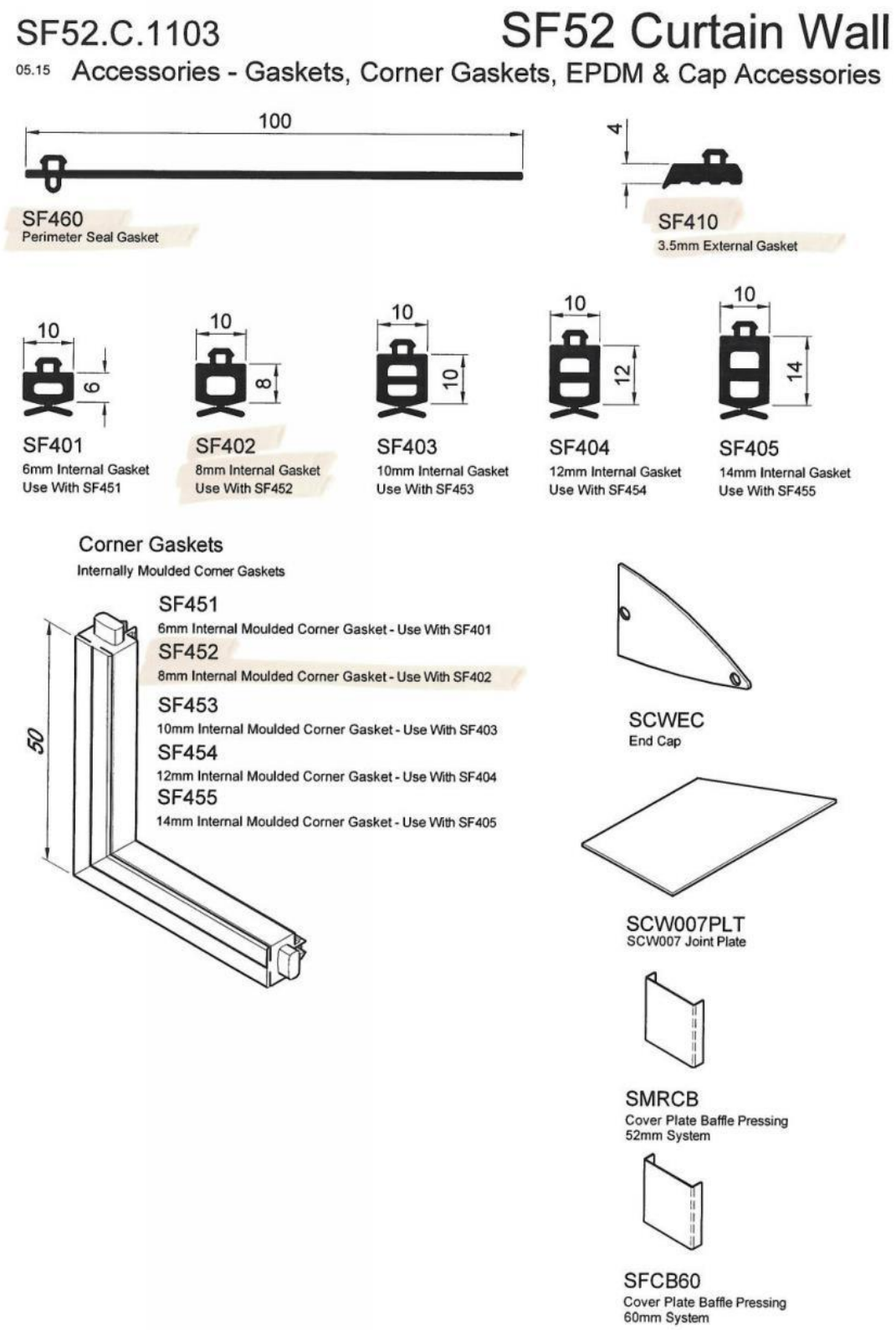

SF52.C.1103
SF52 Curtain Wall
05.15 Accessories - Gaskets, Corner Gaskets, EPDM & Cap Accessories
100
SF460
Perimeter Seal Gasket
4
SF410
3.5mm External Gasket
10
6
SF401
6mm Internal Gasket
Use With SF451
10
8
SF402
8mm Internal Gasket
Use With SF452
10
10
SF403
10mm Internal Gasket
Use With SF453
10
12
SF404
12mm Internal Gasket
Use With SF454
10
14
SF405
14mm Internal Gasket
Use With SF455
Corner Gaskets
Internally Moulded Corner Gaskets
SF451
6mm Internal Moulded Corner Gasket - Use With SF401
SF452
8mm Internal Moulded Corner Gasket - Use With SF402
SF453
10mm Internal Moulded Corner Gasket - Use With SF403
SF454
12mm Internal Moulded Corner Gasket - Use With SF404
SF455
14mm Internal Moulded Corner Gasket - Use With SF405
50
SCWEC
End Cap
SCW007PLT
SCW007 Joint Plate
SMRCB
Cover Plate Baffle Pressing
52mm System
SFCB60
Cover Plate Baffle Pressing
60mm System

Figure 8

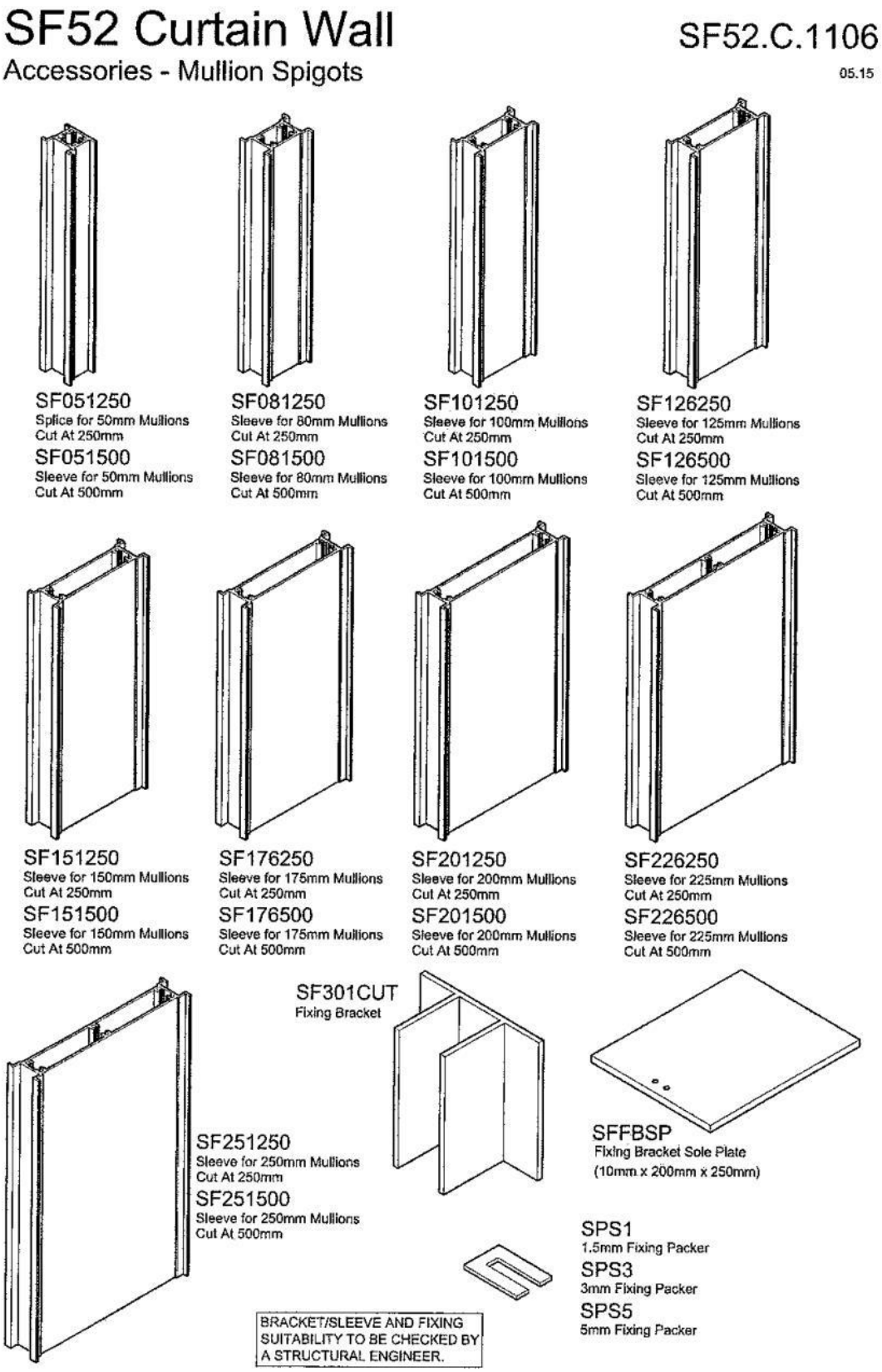

SF52 Curtain Wall
SF52.C.1106
Accessories - Mullion Spigots
05.15
SF051250
Splice for 50mm Mullions
Cut At 250mm
SF051500
Sleeve for 50mm Mullions
Cut At 500mm
SF081250
Sleeve for 80mm Mullions
Cut At 250mm
SF081500
Sleeve for 80mm Mullions
Cut At 500mm
SF101250
Sleeve for 100mm Mullions
Cut At 250mm
SF101500
Sleeve for 100mm Mullions
Cut At 500mm
SF126250
Sleeve for 125mm Mullions
Cut At 250mm
SF126500
Sleeve for 125mm Mullions
Cut At 500mm
SF151250
Sleeve for 150mm Mullions
Cut At 250mm
SF151500
Sleeve for 150mm Mullions
Cut At 500mm
SF176250
Sleeve for 175mm Mullions
Cut At 250mm
SF176500
Sleeve for 175mm Mullions
Cut At 500mm
SF201250
Sleeve for 200mm Mullions
Cut At 250mm
SF201500
Sleeve for 200mm Mullions
Cut At 500mm
SF226250
Sleeve for 225mm Mullions
Cut At 250mm
SF226500
Sleeve for 225mm Mullions
Cut At 500mm
SF301CUT
Fixing Bracket
SFFBSP
Fixing Bracket Sole Plate
(10mm x 200mm x 250mm)
SF251250
Sleeve for 250mm Mullions
Cut At 250mm
SF251500
Sleeve for 250mm Mullions
Cut At 500mm
SPS1
1.5mm Fixing Packer
SPS3
3mm Fixing Packer
SPS5
5mm Fixing Packer
BRACKET/SLEEVE AND FIXING SUITABILITY TO BE CHECKED BY A STRUCTURAL ENGINEER.

Figure 9

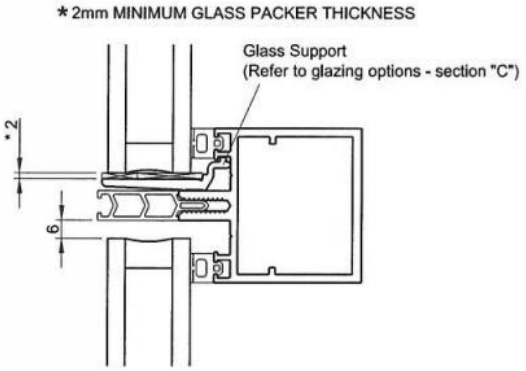
SF52 Curtain Wall

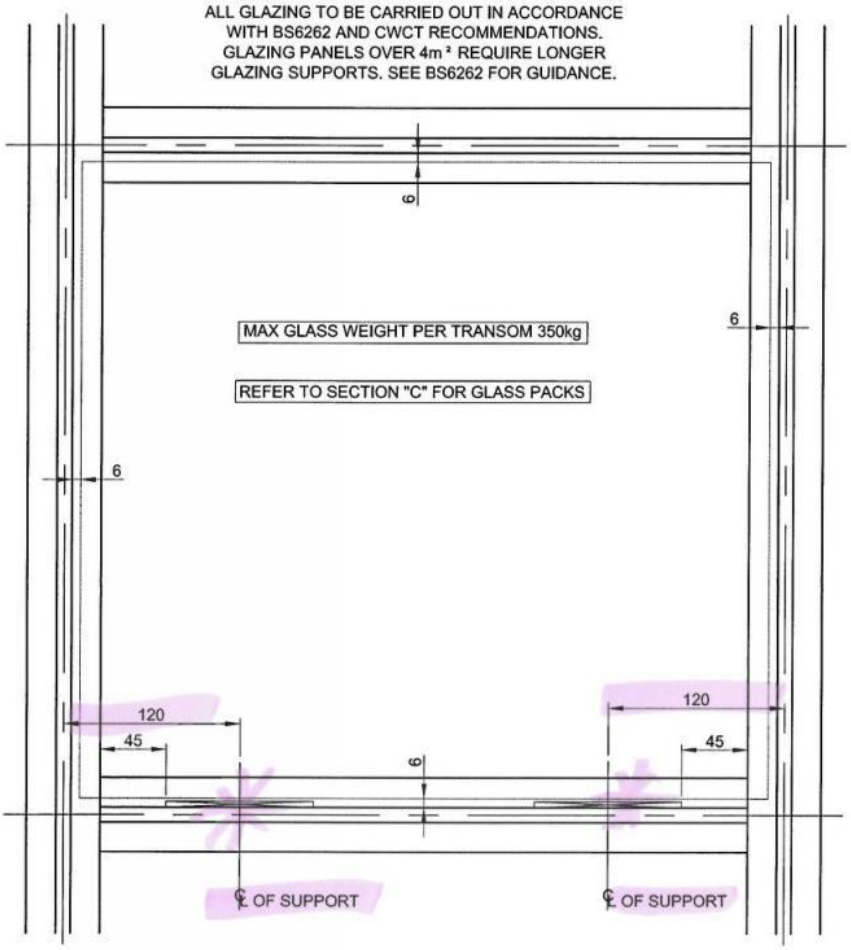
SF52.F.1212

05.15

Installation - Glass Packing & Fitting

1. POSITION GLASS SUPPORTS AS OUTLINED BELOW.
2. POSITION PACKS ON GLASS SUPPORTS. MINIMUM 2mm THICK.
3. GLAZE ENSURING MINIMUM 6mm GAP BETWEEN GLASS AND THERMAL BREAK ON ALL SIDES.





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