

Tensile Adhesion Strength Test

Tech Coatings contracted New Zealand Corrosion Services to conduct tensile adhesion strength tests of FBL-100 Intumescent Coating System on the following samples:

1. 13mm Gib Standard plasterboard.
FBL-100 was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. No top coat
2. 12mm Ecoply Plywood.
FBL-100 was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. No top coat
3. 6mm Villaboard Fibre Cement Sheet.
FBL-100 was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. No top coat
4. 13mm GIB Standard plasterboard.
FBL-100 was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. FBL-100 was then top coated with 2 coats of a water borne enamel.

Test

The test was conducted in accordance with ASTM D4541-09e1 "Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers. The testing surfaces were wiped clean & abraded using fine sandpaper. 50mm or 20mm Dollies were attached using 5min Epoxy Adhesive & allowed to cure for 4 hours. The Dollies were then detached using a self-aligning PosiTector A-AT automatic hydraulic pull tester. The force (in psi) required to remove each Dollie was recorded along with the location of break & approximate percentage of each.

Results

The results of the testing are provided below:

Tech Coatings

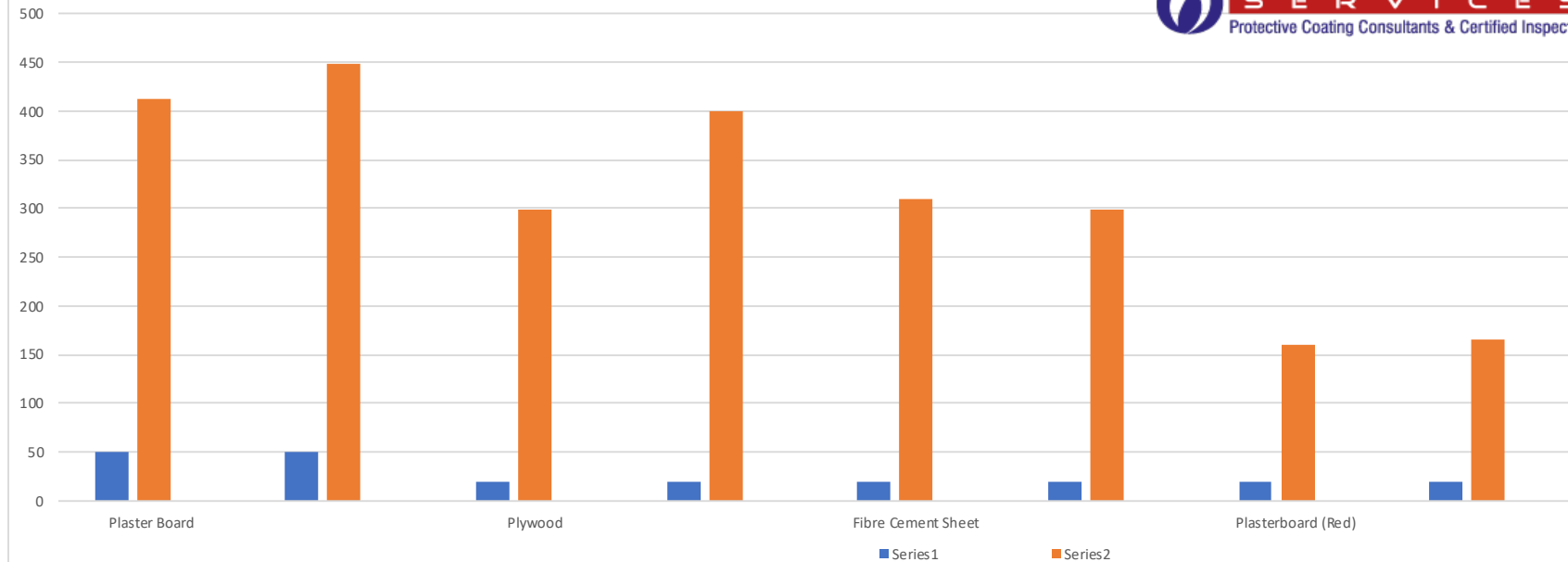


FBL-100 PFP Material Adhesion Test

Substrate Material	Dollie Size (mm)	Pull Off (PSI)	Failure	Comment
Plaster Board	50	412	100% Paper failure	Good result
	50	448	100% Paper failure	Good result
Plywood	20	299	50% glue failure 50% disbondment from red primer	Adhesion to red primer appear to have been compromised
	20	400	5% glue failure 95% disbondment from red primer	Adhesion to red primer appear to have been compromised
Fibre Cement Sheet	20	309	100% Paper failure	Good result
	20	298	100% Paper failure	Good result
Plasterboard (Red)	20	160	100% glue failure	Adhesion to this red appears to be compromised, unsure why
	20	165	100% glue failure	Adhesion to this red appears to be compromised, unsure why

Note. Adhesive 5 Minute Epoxy 75kg. Cured for 4 hrs

FBL-100 Adhesion Chart



ADHESION TEST REPORT FORM

INSPECTION REPORT No: **TCL PFP 001-01**

JOB No: **13mm Gib Standard plasterboard**

DATE: **24.09.18**

Client:	Tech Coatings
Project:	PFP FBL-100 PFP Material
Site:	NZCS

Sample Applied: TBA

Dolly Glued Date: 24.09.18 10:00pm

Pull Off Date: 05.04.18 14:00 am

Curing Temp: 22°C

Adhesive: Araldite 5min 75kg Epoxy

Test Rig: Positector AT-A (50mm)

Standard: NA

Ratings:

	Rating	%	psi	Comment
1.	A	100% Substrate failure (Paper)	412	Acceptable
2.	A	100% Substrate failure (Paper)	448	Acceptable

A.1. Pull-off test for adhesion. ISO 4624-1978.

Nature of failure	Classification
Description	
Cohesive failure of substrate	A
Adhesive failure between substrate and first coat	A/B
Cohesive failure of first coat	B
Adhesive failure between first and second coat	B/C
Adhesive failure between final coat and adhesive	-/Y
Cohesive failure of adhesive	Y
Adhesive failure between adhesive and test cylinder	Y/Z

Comments: 13mm Gib standard plasterboard. FBL-100 ICS applied directly to the plasterboard. No top coat.

Adhesion of the ICS to the paper failed at 412psi.

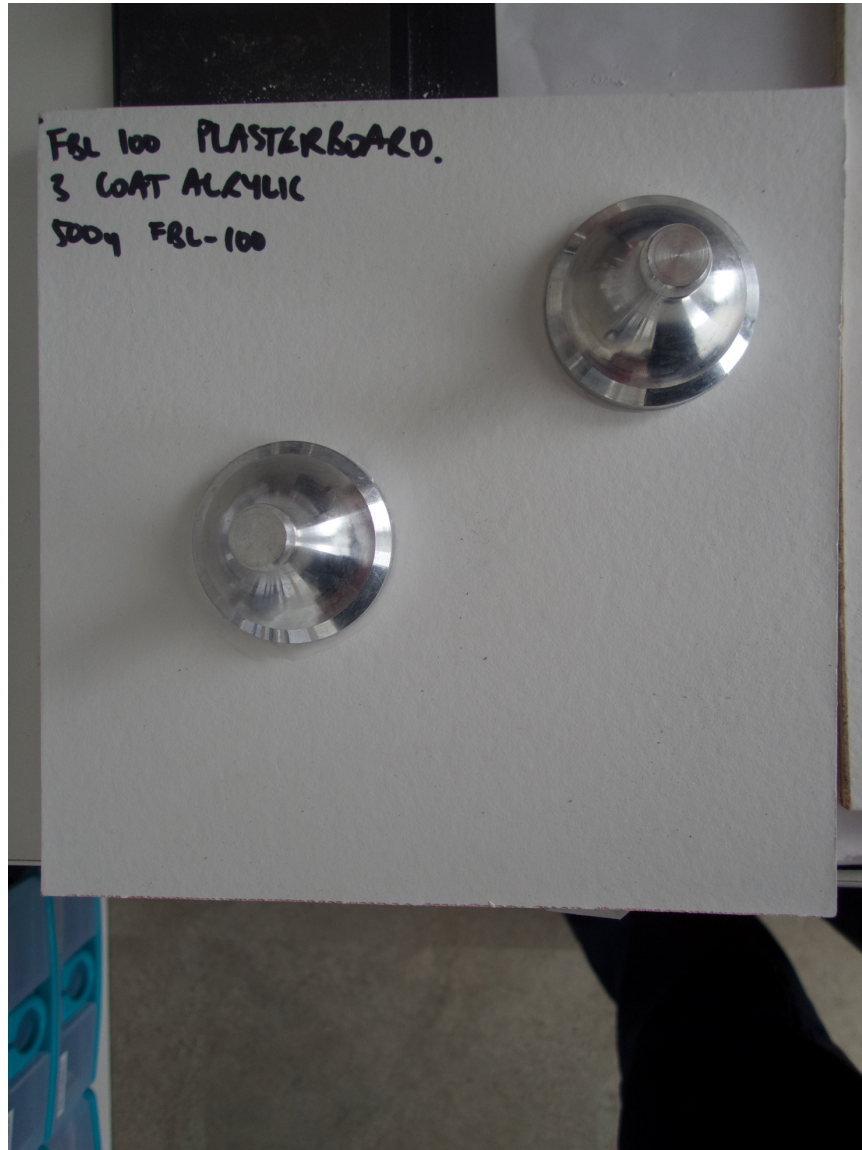
Pull Test apparatus is a PosiTector A-AT automatic hydraulic pull tester. Calibrated within the last 12 Mths.

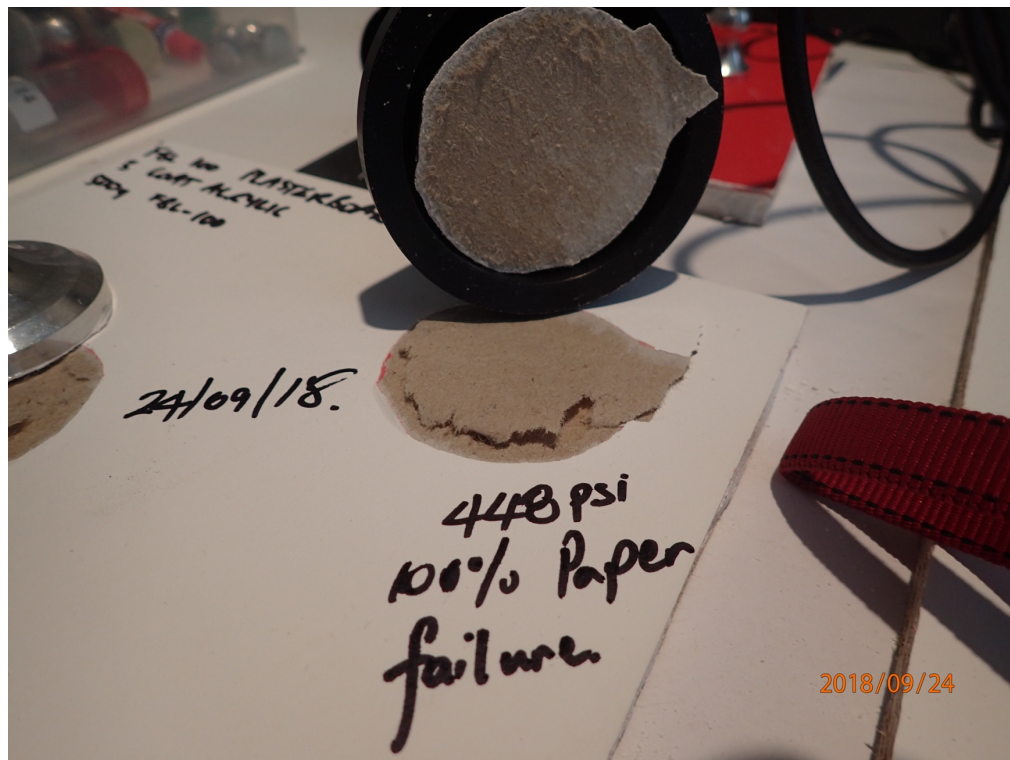
Signed:



Photo of Pull Off Results

1.





ADHESION TEST REPORT FORM

INSPECTION REPORT No: **TCL PFP 001-02**

JOB No: **12mm Ecoply Plywood.**

DATE: **24.09.18**

Client:	Tech Coatings
Project:	PFP FBL-100 PFP Material
Site:	NZCS

Sample Applied: TBA

Dolly Glued Date: 24.09.18 10:00pm

Pull Off Date: 05.04.18 14:00 am

Curing Temp: 22°C

Adhesive: Araldite 5min 75kg Epoxy

Test Rig: Positector AT-A (20mm)

Standard: NA

Ratings:

	Rating	%	psi	Comment
1.	Y/Z-B/C	50% Adhesive 50% Intercoat Disbondment	299	Acceptable just
2.	Y/Z-B/C	5% adhesive, 95% Intercoat Disbondment	400	Acceptable just

A.1. Pull-off test for adhesion. ISO 4624-1978.

Nature of failure	Classification
Description	
Cohesive failure of substrate	A
Adhesive failure between substrate and first coat	A/B
Cohesive failure of first coat	B
Adhesive failure between first and second coat	B/C
Adhesive failure between final coat and adhesive	-/Y
Cohesive failure of adhesive	Y
Adhesive failure between adhesive and test cylinder	Y/Z

Comments: FBL-100 ICS was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. No top coat

Adhesion of the ICS to the red under coat was poor and should be looked at.

Pull Test apparatus is a PosiTector A-AT automatic hydraulic pull tester. Calibrated within the last 12 Mths.

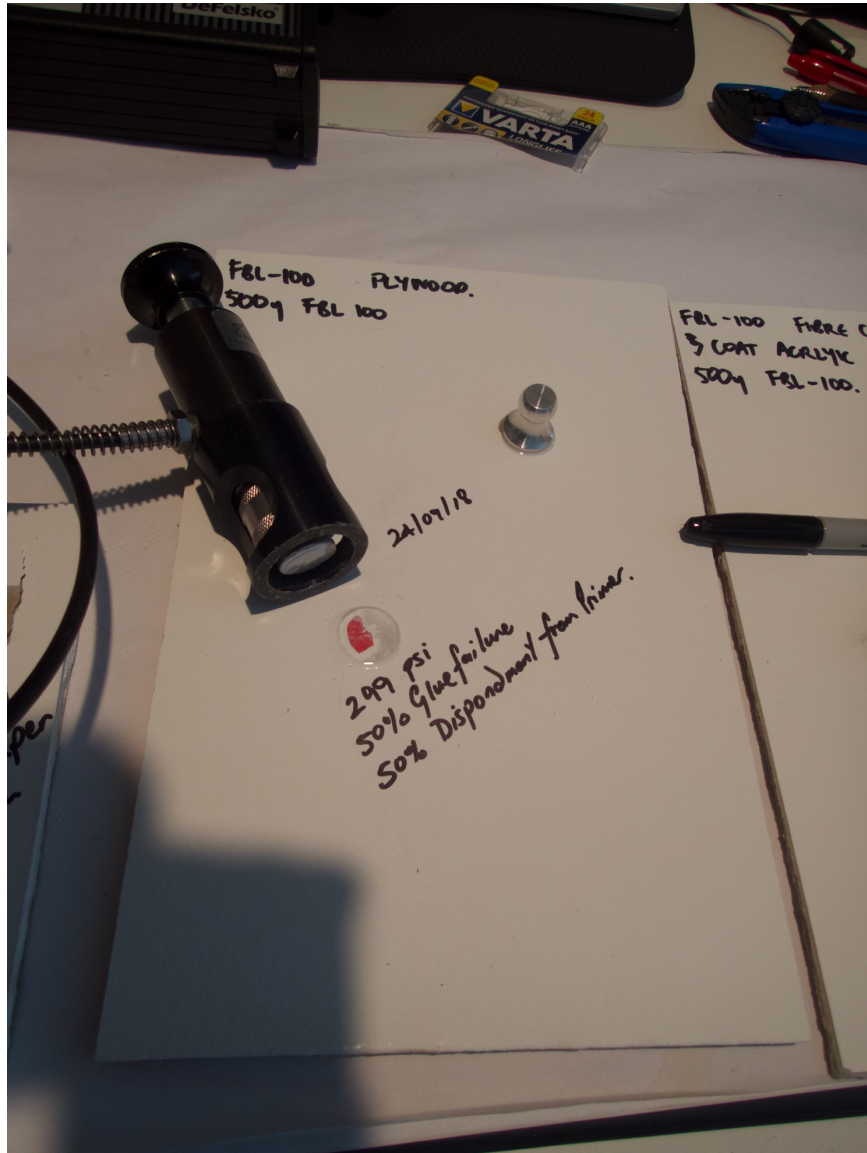
Signed:

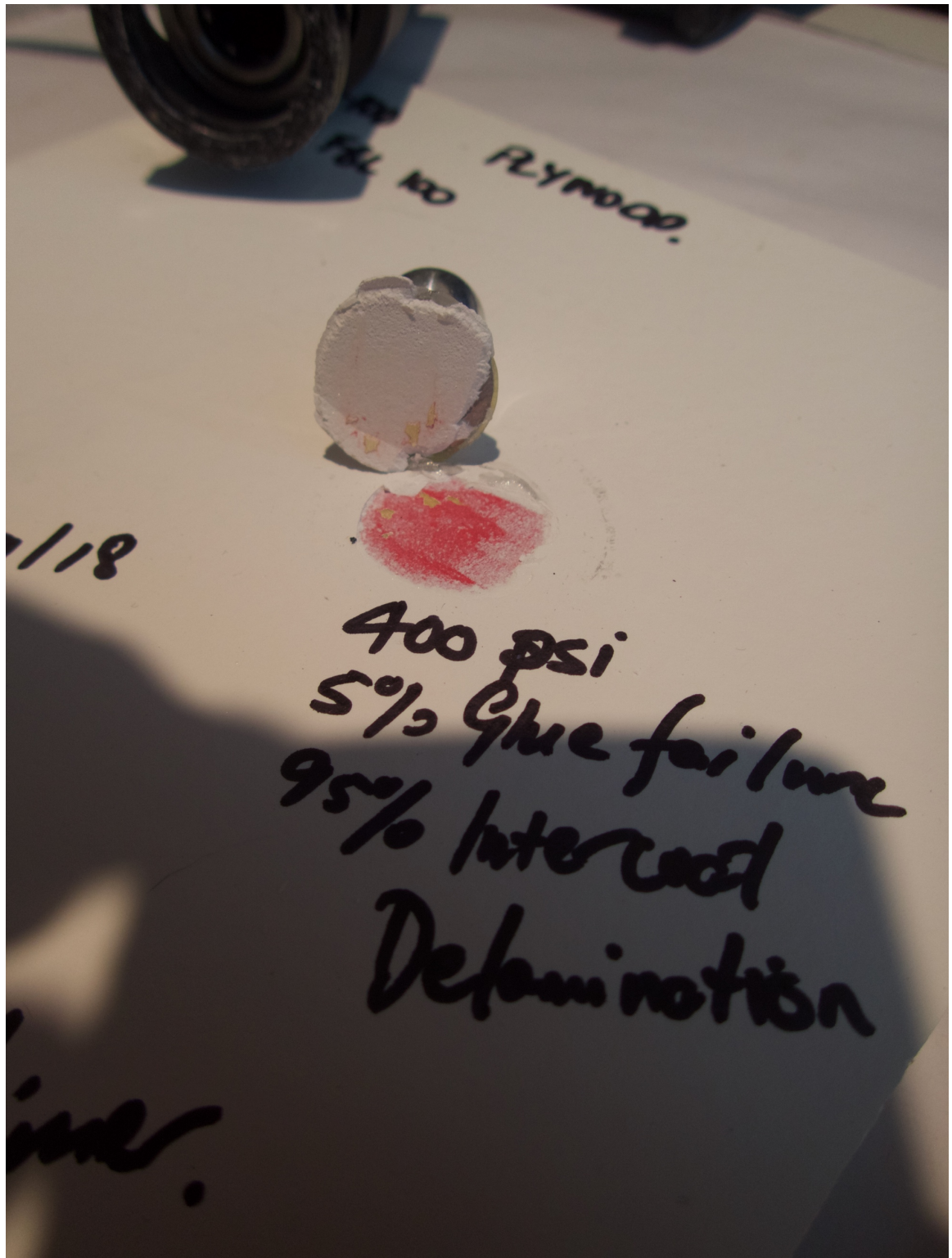


NZ CORROSION SERVICES Ltd

Photo of Pull Off Results

1.





2.

ADHESION TEST REPORT FORM

INSPECTION REPORT No: **TCL PFP 001-03**

JOB No: **6mm Fibre Cement Sheet**

DATE: **24.09.18**

Client:	Tech Coatings
Project:	PFP FBL-100 PFP Material
Site:	NZCS

Sample Applied: TBA

Dolly Glued Date: 24.09.18 10:00pm

Pull Off Date: 05.04.18 14:00 am

Curing Temp: 22°C

Adhesive: Araldite 5min 75kg Epoxy

Test Rig: Positector AT-A (20mm)

Standard: NA

A.1. Pull-off test for adhesion. ISO 4624-1978.

Nature of failure	Classification
Description	
Cohesive failure of substrate	A
Adhesive failure between substrate and first coat	A/B
Cohesive failure of first coat	B
Adhesive failure between first and second coat	B/C
Adhesive failure between final coat and adhesive	-/Y
Cohesive failure of adhesive	Y
Adhesive failure between adhesive and test cylinder	Y/Z

Ratings:

	Rating	%	psi	Comment
1.	A	100% substrate failure	309	Acceptable just
2.	A	100% substrate failure	298	Acceptable just

Comments: 6mm Villaboard Fibre Cement Sheet. FBL-100 was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. No top coat

Adhesion of the ICS to Fibre Cement Sheet was excellent, the FCS failed cohesively.

Pull Test apparatus is a PosiTector A-AT automatic hydraulic pull tester. Calibrated within the last 12 Mths.

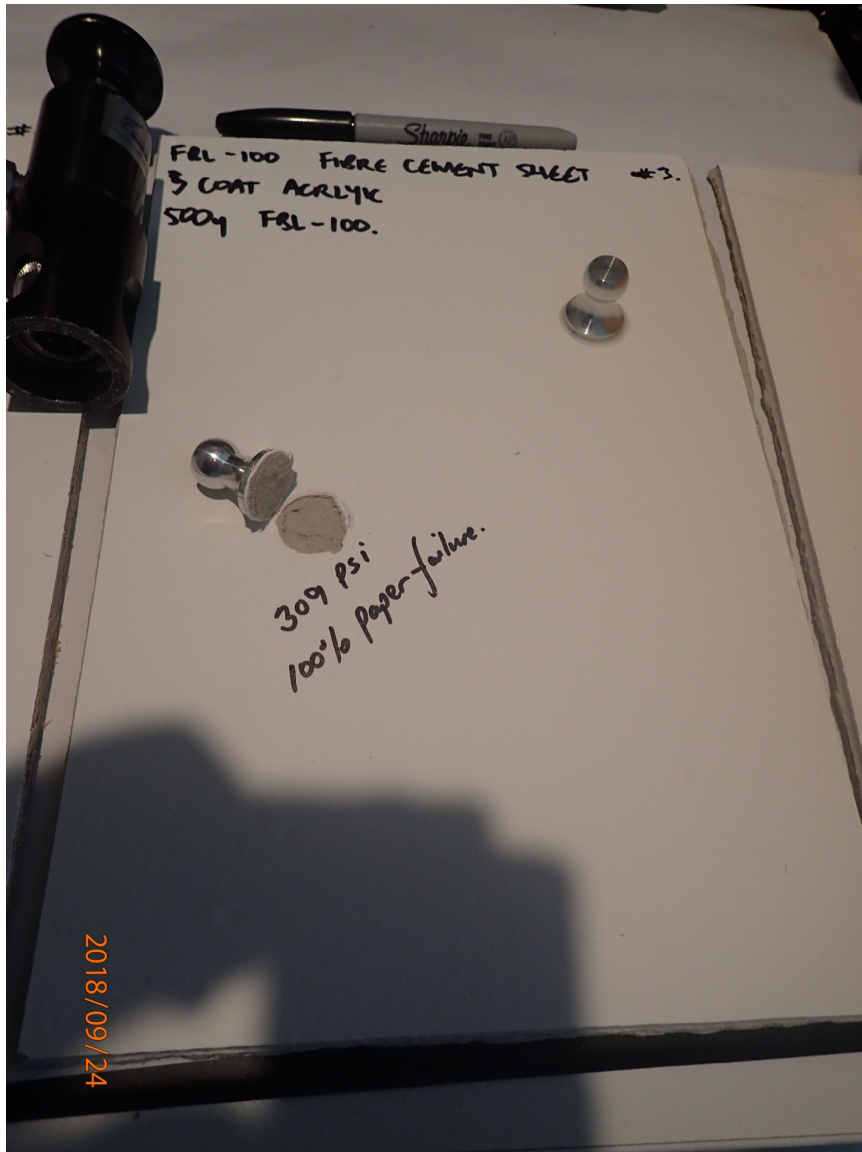
Signed:

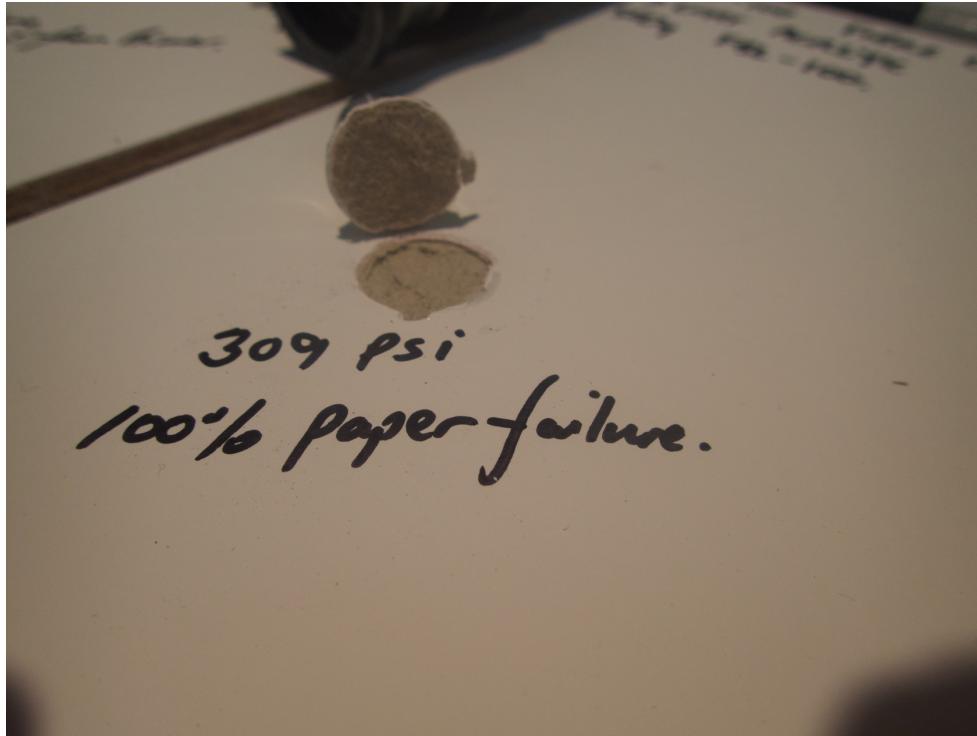


NZ CORROSION SERVICES Ltd

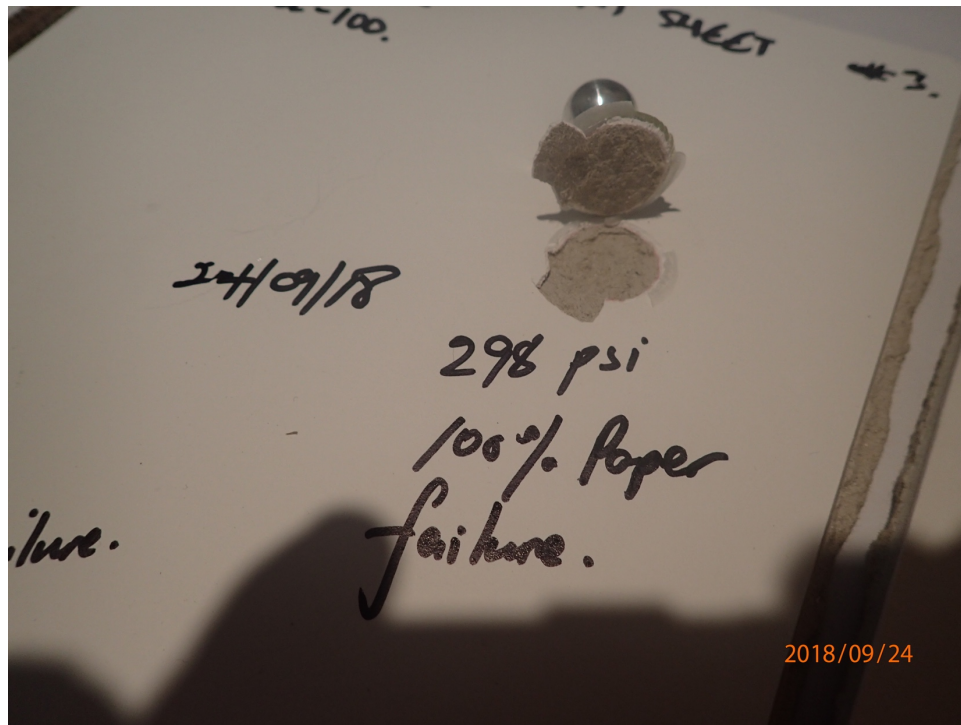
Photo of Pull Off Results

1.





2.



ADHESION TEST REPORT FORM

INSPECTION REPORT No: **TCL PFP 001-04**

JOB No: **13mm Gib Standard Plasterboard - painted**

DATE: **24.09.18**

Client:	Tech Coatings
Project:	PFP FBL-100 PFP Material
Site:	NZCS

Sample Applied: **TBA**

Dolly Glued Date: **24.09.18** **10:00pm**

Pull Off Date: **05.04.18** **14:00 am**

Curing Temp: **22°C**

Adhesive: **Araldite 5min 75kg Epoxy**

Test Rig: **Positector AT-A 20mm**

Standard: **NA**

Ratings:

	Rating	%	psi	Comment
1.	Y/Z	100% substrate failure	160	Failed
2.	Y/Z	100% substrate failure	168	Failed

A.1. Pull-off test for adhesion. ISO 4624-1978.

Nature of failure	Classification
Description	
Cohesive failure of substrate	A
Adhesive failure between substrate and first coat	A/B
Cohesive failure of first coat	B
Adhesive failure between first and second coat	B/C
Adhesive failure between final coat and adhesive	-/Y
Cohesive failure of adhesive	Y
Adhesive failure between adhesive and test cylinder	Y/Z

Comments: 13mm GIB Standard plasterboard. FBL-100 ICS was applied over a pre-painted surface. The pre-painted surface was a 3-coat water-borne enamel system. FBL-100 was then top coated with 2 coats of a water-borne enamel.

Adhesion to the red top coat failed. Adhesion compromised, unsure why.

Pull Test apparatus is a PosiTector A-AT automatic hydraulic pull tester. Calibrated within the last 12 Mths.

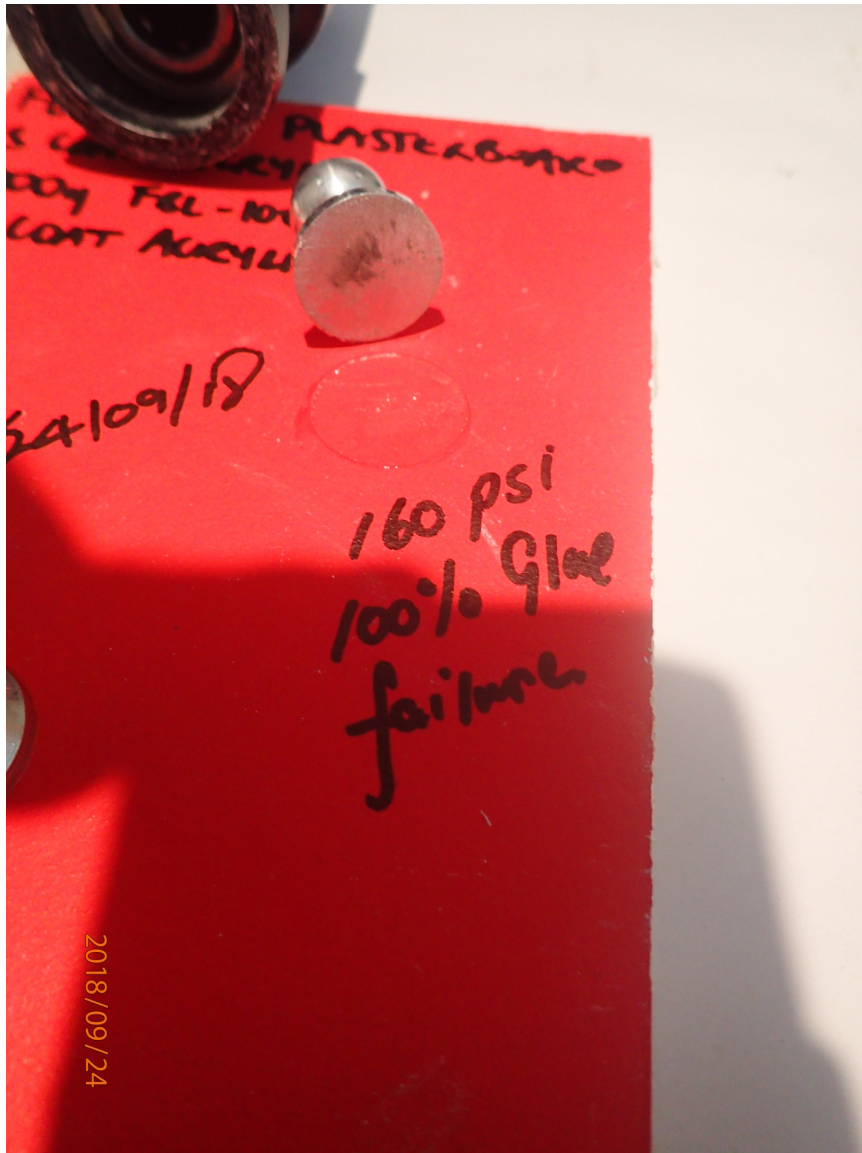
Signed:



NZ CORROSION SERVICES Ltd

Photo of Pull Off Results

1.





2.