

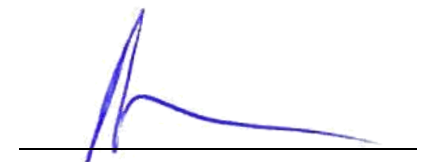
# DC2282

## Testing of Norski Two Part Epoxy Mortar

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# Testing of Norski Two Part Epoxy Mortar

## 1. CLIENT

Norski Holdings Limited  
10 Northpoint Street  
Plimmerton  
Porirua 5024  
New Zealand

## 2. INTRODUCTION

BRANZ was requested by Norski Holdings Ltd to complete compressive strength (ASTM C579), tensile strength (ASTM C307), hardness and direct tensile testing of bond strength on concrete of an two part epoxy mortar.

## 3. MATERIALS

The client supplied two 500 ml containers of Norski Epoxy Mortar Part A Base and two 500 ml containers of Norski Epoxy Mortar Part B Hardener. BRANZ was not involved in the selection of these samples.

All other material used for testing was either purchased by BRANZ from local building supply outlets or obtained from existing BRANZ stock.

## 4. METHODS

### 4.1 Compressive strength (ASTM C579)

Samples were tested after conditioning for 7 days to ASTM C579 'Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concrete' using Method A.

Failure load was measured with a Shimadzu UDH 100 testing machine with a rate of loading = 41 MPa/min.

The trowelled surface of test cylinders was capped with GC 'Fujirock GP' (ISO 6873 Type 4 dental stone).

### 4.2 Tensile strength (ASTM C307)

Samples were tested after conditioning for 7 days to ASTM C307 'Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.'

Failure load was measured with an Instron Universal testing machine at a rate of 6.4 mm/min.

### 4.3 Brinell Hardness

Brinell hardness was tested with a 10 mm ball indentor after 7 days conditioning.

Load was applied with a Shimadzu UH500 KNI testing machine.

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The indentation diameter was assessed using a PTI 8 mm eye glass.

#### 4.4 Direct tensile testing of bond strength on concrete

Performed using 50 x 50 x 50 mm concrete cubes and 100 x 100 x 30 mm concrete bases. The test methodology involved adhering the cube to the base using a uniform layer of epoxy mortar.

After conditioning for 7 days an expanding bolt was inserted into a hole drilled in the concrete cube to allow measurement of the bond strength in tension. The bond strength was tested with an Instron Universal testing machine at a rate of 5.0 mm/min.

### 5. RESULTS

The results reported here relate only to the items tested.

#### 5.1 Compressive strength (ASTM C579)

The compressive strength results are detailed in Table 1.

**Table 1: Norski Two Part Epoxy Mortar Compressive Strength**

Specimen No.	Diameter at Mid-Height (mm)		Capped Length (mm)	Failure Load (kN)	Compressive Strength (MPa)	Failure Mode
	(i)	(ii)				
1	24.93	24.85	25.87	27.32	56.15	shear
2	24.82	24.86	25.81	26.30	54.27	shear
3	24.85	24.88	25.46	26.32	54.20	normal cone
4	24.82	24.83	25.39	26.45	54.65	normal cone
5	24.81	24.83	25.55	27.45	56.73	normal cone
6	24.79	24.84	25.91	26.17	54.11	normal cone
7	24.85	24.75	25.55	26.35	54.55	normal cone
8	24.86	24.86	25.71	27.35	56.35	normal cone
9	24.83	24.89	25.86	27.20	56.04	normal cone

The mean compressive strength was determined to be  $55.2 \pm 1.1$  MPa.

#### 5.2 Tensile strength (ASTM C307)

The tensile strength results are detailed in Table 2.

**Table 2: Norski Two Part Epoxy Mortar Tensile Strength**

Specimen No.	Failure Load (kN)	Tensile Strength (MPa)
1	8.45	12.38
2	8.69	12.95
3	8.21	11.46
4	9.14	13.00
5	7.76	10.30
6	9.21	13.37

The mean tensile strength was determined to be  $12.2 \pm 1.2$  MPa.

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### 5.3 Brinell Hardness

The Brinell hardness results are detailed in Table 3.

**Table 3: Norski Two Part Epoxy Mortar Brinell Hardness**

Specimen No.	Test	Reading / mm	Brinell Hardness 500Kgf / 10mm ball
1	a	6.10	15.3
	b	6.10	15.3
	c	6.00	15.9
2	a	5.85	16.8
	b	5.85	16.8
	c	5.65	18.2
3	a	5.85	16.8
	b	5.95	16.2
	c	6.00	15.9

The mean Brinell hardness was determined to be 16.3. This is as expected based on the compressive strength results in Section 5.1.

### 5.4 Direct tensile testing of bond strength on concrete

The tensile bond results are detailed in Table 4.

**Table 4: Norski Two Part Epoxy Mortar Tensile Bond**

Specimen No.	Failure Load (kN)	Tensile Strength (MPa)	Failure Mode
1	4.74	1.90	Concrete failure
2	4.79	1.92	Concrete failure
3	4.60	1.84	Concrete failure
4	5.47	2.19	Concrete and adhesion failure
5	3.11	1.24	Adhesion failure
6	4.48	1.79	Concrete failure

The mean bond strength was determined to be  $1.8 \pm 0.3$  MPa. As can be seen in Table 4, concrete failure was the dominant mechanism.

## 6. REFERENCES

ASTM C307. Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.

ASTM C579. Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes.

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