NIPPON PAINT

NIPPON C2M

Flexible, Cement-Infused Metal Bonding and Coating Agent

ASTM INTERNATIONAL
Standards Worldwide

ISO

Superior Technology that Yields Greater Returns on Your Investment

NIPPON C2M combines two unique performance characteristics, previously thought impossible for a cementitious product:

1. Cement Bonding to Metal

NIPPON C2M is 25% cement yet bonds aggressively with nearly all metal surfaces. Adhesion characteristics are maintained even on surfaces that are highly corroded with rust. NIPPON C2M fulfills the age old desire to coat metal surfaces with an inexpensive yet extremely durable product like cement.

2. Flexibility

Flexible cement? That's correct. NIPPON C2M can bend as much as 90 degrees without cracking or lifting when properly applied. This characteristic allows NIPPON C2M to be applied to "live" surfaces that expand and contract due to internal pressure changes or external influences such as freeze/thaw.

The ability to apply NIPPON C2M directly to hard rust metal surfaces results in significantly less preparation time and lower labor costs without sacrificing performance.

This reduction in labor allows contractors to submit bids that are up to 50% lower than bids using blasting or grinding while maintaining margins.

Despite the additional materials expense of purchasing NIPPON C2M, the much greater offset in labor charges allows the contractor to generate greater profit per job, even when the total bid value is lower than a bid using blasting or grinding.

NIPPON C2M's advanced formula is designed for application directly over hard rust surfaces while maintaining far superior adhesion characteristics that are two to three times industry standards[1].
The surface only needs to be power washed and degreased prior to application. **NO ABRASIVE BLASTING IS REQUIRED.**

NIPPON C2M's unique performance characteristics result in:

- Less surface prep time
- Fewer containment issues
- Lower disposal costs
- Increased profitability
- Greater bid conversion

[1] 2012 pull tests performed by a NACE Certified Engineer

Independent Testing

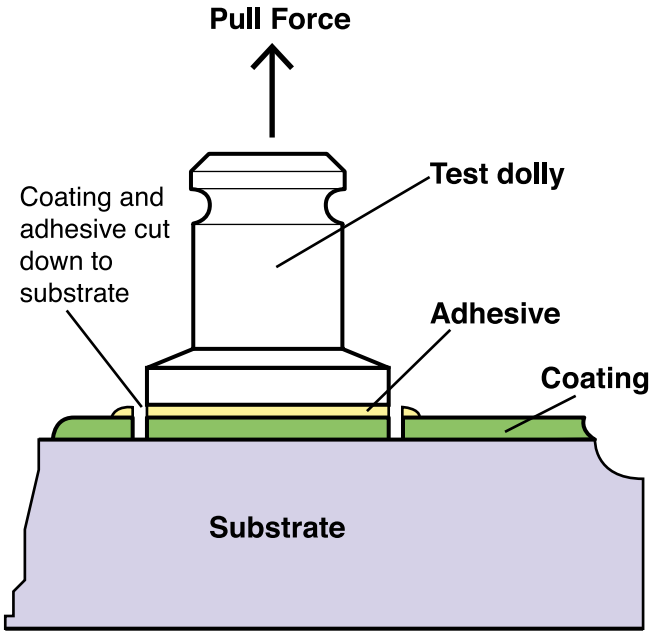
Extensive testing was conducted at Twining Laboratories in California dating as far back as 2010 using ASTM testing standards. The table below lists the results of these tests.

TEST	TEST TYPE	COATING	RESULT / RATING
ISO 1519:2002	Bend	C2M	Cracking, no detachment
ISO 12944	Scribe (240 hours)	C2M+ top coat	Pass “C3 – High”
ASTM B117 + D1654	Scribe (192 hours)	C2M (no top coat)	9 and 9 (two panels)
ASTM B117 + D1654	Scribe (192 hours)	C2M + top coat	9 (all panels)
ASTM B117-11	Salt Spray/Fog (96 hours)	C2M (no top coat)	8 and 9 (two panels)
ASTM B117-11	Salt Spray/Fog (192 hours)	C2M (no top coat)	7 and 9 (two panels)
ASTM B117-11	Salt Spray/Fog (96 hours)	C2M + top coat	8-10 (four panels)
ASTM B117-11	Salt Spray/Fog (192 hours)	C2M + top coat	7-9 (four panels)
ASTM D3359	Pull Test	C2M (no top coat)	Pass (2 panels)
ASTM D3359	Pull Test	C2M + top coat	Pass (3 panels)
ASTM 4060	Abrasion Test	C2M (no top coat)	118.4 mg loss
ASTM 4060	Abrasion Test	C2M (no top coat)	113.7 mg loss
ASTM 4060	Abrasion Test	C2M + topcoat	42.0-171.1 mg loss
ASTM D4541	Pull Test	C2M (no top coat)	289-1047 psi

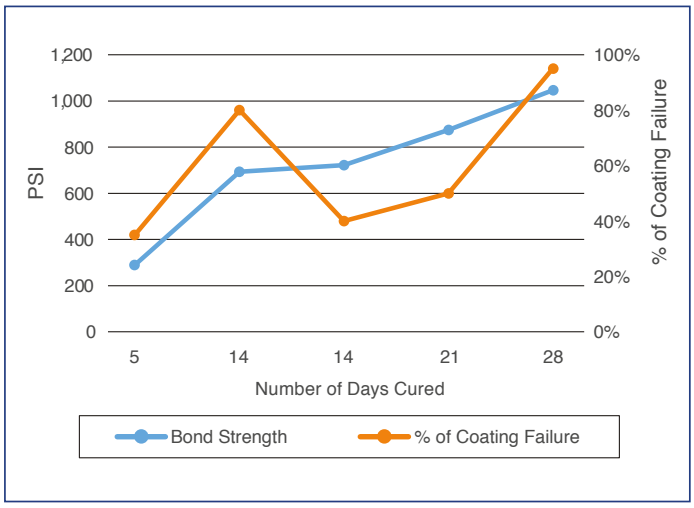
In 2015, additional pull testing was conducted at Twining Laboratories according to ASTM D 4541 standards on non-profiled cold rolled steel. As shown in the table and graph below, NIPPON C2M reached a level exceeding 10,000 psi when fully cured after 28 days. Industry standards are 200 psi, which NIPPON C2M exceeded after only 5 days cure time.

SAMPLE	CURE TIME	BOND STRENGTH (PSI)	BOND STRENGTH (KG/CM2)	BOND STRENGTH (BAR)	MODE OF FAILURE (% OF COATING)
A	28 days	1,047	73.6	72.2	95%
B	21 days	875	61.5	60.3	50%
C	14 days	722	50.8	49.8	40%
D	14 days	693	48.7	47.8	80%
E	5 days	289	20.31	9.9	35%

Independent Testing



Impact of Cure Time



In 2015, salt spraying testing was held at Exova Labs, one of the world's largest independent testing companies, on non-profiled cold rolled steel according to ISO Standards 12944. This test places a scribe down the centre of a 120cm x 90cm coated panel to expose the underlying substrate. The panel is then placed in a chamber where it is continuously in contact with a salt spray solution for 240 hours and 480 hours in salt fog environment. A passing grade results when the coating prevents rust migration from the scribed area into the area that remains covered by the coating being tested.

The panels coated with NIPPON C2M passed level "C3-HIGH" for corrosion resistance, thereby making NIPPON C2M available for use within the European Union as a direct to metal corrosion inhibitor.

ISO

Exova Testing Advising Assuring

Application: Spalled Rebar and FRP

NIPPON C2M solves the age-old problems cause by Spalled Rebar.

PROBLEM

Spalled rebar creates 2 specific repair problems.

1. Repair cement will not adhere to the rusted rebar, thereby rendering it structurally useless.
2. Repair cement creates a cold joint with the old cement that will fail rapidly.

SOLUTION

NIPPON C2M solves these issues by adhering aggressively to both the rusted rebar and the original cement work.

Please refer to pull test data on both corroded metal and slab concrete.

1. Spalled beam and rusted rebar

2. Coated beam and rebar

3. Coated beam and rebar

4. Patched concrete on coated beam

5. Finished beam

NIPPON C2M extremely strong adhesion properties have led to unique applications in the Fiber Reinforced Polymer (FRP) Industry.

PROBLEM

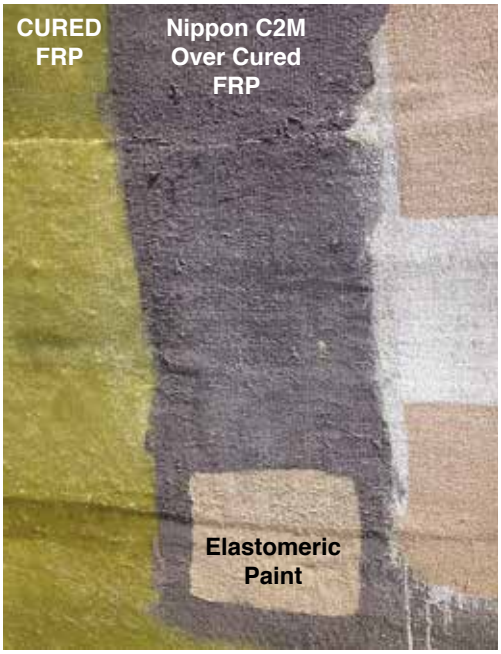
Although, incredibly strong and functional, finished FRP solutions are aesthetically unpleasing. And due to the surface profile and characteristics of the epoxy resins used, it is extremely difficult to cover FRP with a coating that remains adhered.

SOLUTION

NIPPON C2M has been proven to adhere aggressively to finished FRP solutions and because of its cementitious nature, NIPPON C2M provides a cement-like surface that

(a) can be painted over directly, or

(b) creates an ideal substrate for troweling cement



Project Examples

Nippon Paint leverages innovative technology to provide comprehensive asset maintenance solutions for industrial, commercial and government infrastructure.

Our Advanced Material Coatings **protect and extend** the life of critical assets in a manner that is:

- Cost Effective
- Integrated and Flexible
- Easy to Prepare and Use
- Environmentally Friendly

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