

April 24, 2010
File: TB92059

MADISON, LLC dba Proven Performance Chemicals (PPC)
9126 B Industrial Blvd. Covington, GA 30014

Attention: Dr. R. T. Hemmings

Dear Sir;

RE: LABORATORY TESTING OF CONCRETE CHEMICAL ADMIXTURE

We are pleased to present our final results for laboratory testing of a chemical admixture for concrete in accordance with ASTM C494-08 "Standard Specifications for Chemical Admixtures for Concrete".

The client supplied a sample of a Type F water reducing, high range, product identified as "M-Flow 86". The scope of work covered by this report is for "Level 1" testing for proof of compliance with the performance requirements defined in Table 1 of ASTM C494, limited to plastic properties and compressive strength development.

This report includes preparation of a control concrete mix design without admixture addition and preparation of concrete with the recommended dosage of the M-Flow 86 admixture, proportioned as per ACI 211.1-91. As per Table 1, the M-Flow 86 concrete was prepared with water content of 87% of the control, with the M-Flow 86 added at a dosage sufficient to produce a mixture with the same consistency as the control, as measure by the standard slump test. The control and test concrete was tested in the plastic state for slump (ASTM C143), air content (ASTM C231), time of set (ASTM C403) The control and M-Flow 86 concrete will be tested for compressive strength (ASTM C39) at 1, 3, 7, 28, 90 days, 6 months and one year. This report presents all plastic properties and strength testing to 365 days for the Control and M-Flow 86 concrete (See Table 1).

Yours truly,

AMEC Earth & Environmental

A division of AMEC Americas Limited



Bruce J. Cornelius, P. Eng.
Associate Materials Engineer

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Table 1. Mix design and test results

| | US Units | | Metric | |
|--|----------|---|------------------|---|
| | Control | M-Flow 86 | Control | M-Flow 86 |
| Cement (lbs/ft³) (kg/m³) | 517 | 517 | 307 | 307 |
| Stone (lbs/ft³) (kg/m³) | 2048 | 2117 | 1215 | 1256 |
| Sand (lbs/ft³) (kg/m³) | 1256 | 1298 | 745 | 770 |
| Water (lbs/ft³) (kg/m³) | 319 | 281 | 189.2 | 166.5 |
| Admixture Dosage (oz/100lbs) (ml/100kg) | 0 | 5.36 | 0 | 350 |
| w:cm | 0.62 | 0.54 | 0.62 | 0.54 |
| Slump (inches) (mm) | 4.75 | 5.25 | 120 | 135 |
| Plastic Air (%) | 2.1 | 3.5 | 2.1 | 3.1 |
| Density (lbs/ft³) (kg/m³) | 152.5 | 154.2 | 2442 | 2425 |
| Compressive Strength | | | | |
| 1 day (psi) (MPa) | 1327 | 2625 | 9.2 | 18.1 |
| 3 days (psi) (MPa) | 2871 | 3799 | 19.8 | 26.2 |
| 7 days (psi) (MPa) | 3785 | 4771 | 26.1 | 32.9 |
| 28 days (psi) (MPa) | 4669 | 5887 | 32.2 | 40.6 |
| 90 days (psi) (MPa) | 5706 | 7033 | 39.4 | 48.5 |
| 6 months (psi) (MPa) | 6177 | 7740 | 42.6 | 53.4 |
| 1 year (psi) (MPa) | 7145 | 8424 | 49.3 | 58.1 |
| Compressive Strength, % of Control | | | | |
| 1 day (C494 Req.) | - | 197 (140) | - | 197 (140) |
| 3 days (C494 Req.) | - | 132 (125) | - | 132 (125) |
| 7 days (C494 Req.) | - | 126 (115) | - | 126 (115) |
| 28 days (C494 Req.) | - | 126 (110) | - | 126 (110) |
| 90 days (C494 Req.) | - | 126 {120}* 123 {117}* 123 {117}* 118 (100) | - - - - | 126 {120}* 123 {117}* 123 {117}* 118 (100) |
| 6 months (C494 Req.) | - | 126 {113}* 118 (100) | - - | 126 {113}* 118 (100) |
| 1 year (C494 Req.) | - | 118 (100) | - | 118 (100) |
| Initial Set (minutes) | 339 | 375 | 339 | 375 |
| Final Set (minutes) | 495 | 472 | 495 | 472 |

Certificate of Compliance

Date : April 24, 2010

MADISON, LLC dba Proven Performance Chemicals (PPC)

832 East Hightower Trail, PO Box 1169
Social Circle, GA 30025

To Whom It May Concern,

This is to certify that **PPC M-Flow 86**, a High Range Water Reducing Admixture, meets or exceeds the physical requirements of:

ASTM C-494 Types A and F

with regard to plastic properties and compressive strength development.

The physical testing shows that, with reference to compressive strength at 365 days age, the admixture shall be considered to qualify.

PPC M-Flow 86 is free of manufacturing defects and will meet PPC Admixtures currently published physical properties and performance characteristics when used in accordance with PPC Admixtures directions and tested by ASTM Standards. **PPC M-Flow 86** does not contain any intentionally added chlorides.

Yours truly,

AMEC Earth & Environmental

A division of AMEC Americas Limited

A handwritten signature in black ink, appearing to read "B.J. Cornelius".

Bruce J. Cornelius, P. Eng.
Associate Materials Engineer