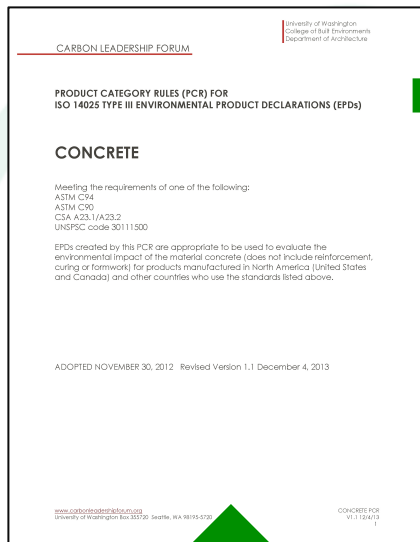

Concrete PCR and EPDs

Lionel Lemay, PE, SE, LEED AP
Sr. VP, Sustainable Development

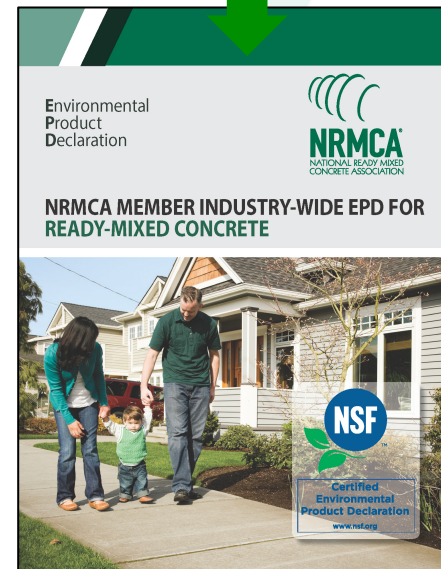


Brief History

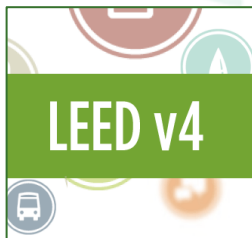
Nov 2012



Feb 2013



Oct 2014



2011-2013



Feb 2011

Product Category Rules (PCR)

- Carbon Leadership Forum
 - CLF PCR v1 Nov 2012
 - CLF PCR v1.1 Dec 2013

University of Washington
College of Built Environments
Department of Architecture

CARBON LEADERSHIP FORUM

**PRODUCT CATEGORY RULES (PCR) FOR
ISO 14025 TYPE III ENVIRONMENTAL PRODUCT DECLARATIONS (EPDs)**

CONCRETE

Meeting the requirements of one of the following:
ASTM C94
ASTM C90
CSA A23.1/A23.2
UNSPSC code 30111500

EPDs created by this PCR are appropriate to be used to evaluate the environmental impact of the material concrete (does not include reinforcement, curing or formwork) for products manufactured in North America (United States and Canada) and other countries who use the standards listed above.

ADOPTED NOVEMBER 30, 2012 Revised Version 1.1 December 4, 2013

www.carbonleadershipforum.org
University of Washington Box 355720 Seattle, WA 98195-5720

CONCRETE PCR
V1.1 12/4/13
1

NRMCA EPD Program

- Verify (certify) EPDs
- Reviews LCAs
- Develops PCRs

- Encourage members to publish EPDs

- Third party verifiers



Athena
Sustainable Materials
Institute

CARBON SENSE
solutions inc



NRMCA Verified EPDs

- 4 companies
- 2000 products
- 4 EPDs verified in other programs



Environmental Product Declaration

This Environmental Product Declaration (EPD) covers 1,479 concrete mixes produced for 7 different service areas at 8 concrete plants owned and operated by Central Concrete, a U.S. Concrete Company in the San Francisco Bay Area.



Environmental Product Declaration



Environmental Product Declaration

This Environmental Product Declaration (EPD) covers twelve concrete mixes produced by CEMEX at the Pier 92 plant in San Francisco, California.



Environmental Product Declaration (EPD) for Concrete

Company
ARGOS is a global business serving customers and communities. We produce, distribute, and sell more than 50 countries, and...

Headquarters
CEMEX USA Headquarters
820 Memorial City Way
Houston, TX 77024
(+1) 713-650-6200

Plants covered in this EPD

Atlanta 2001 Hwy 114 Johns, TX 75207	Haskell 1568 Keller Hicks Rd Fort Worth, TX 76117	Richardson 1550 Digital Dr Richardson, TX 75081
Adriano 8400 New York Ave Adriano, TX 75019	Hunt 3112 Phoebe Lane Rd Hunt, TX 75648	Seguin 1027 Janis Rd Seguin, TX 76135
Coppell 805 N. Hwy 121 Coppell, TX 75019	Irving 6100 Valley View Ln. Irving, TX 75039	Southlake 1968 Burnlow Southlake, TX 75092
Downtown Dallas 248 Singleton Blvd Dallas, TX 75212	Levellille 1225 S. Railroad Levellille, TX 75027	Southside 6100 Oak Hempall Rd. S Fort Worth, TX 76134
El North 880 N. Houston Fort Worth, TX 76110	Mesquite 1719 Sycamore Rd Mesquite, TX 75149	Terrell 103 Metcalfes Way Terrell, TX 75159
Frisco 15000 Hwy 121 Frisco, TX 75033	Prosper 770 S. Dallas Pkwy Prosper, TX 75078	Waukegan 4100 North Hwy 77 Waukegan, TX 75156

About Argos Ready Mix South Central
Argos Ready Mix South Central, headquartered in Irving, Texas, is a focused concrete supplier serving the major metropolitan market of Dallas – Ft. Worth. From Argos' network of 50 concrete plants concentrated in this area, production is nearly two million yards of concrete annually.

Argos Ready Mix South Central is part of Argos USA Corp., a wholly owned subsidiary of Cemex USA S.A., which, in turn, is a publicly traded corporation with headquarters in Colombia, South America. Argos is a member of the Dow Jones Sustainability Index.

EPD Program Operator
National Ready Mix Concrete Association
800 Spring Street, Silver Spring, MD 20910
301-587-1400
www.nrmca.org/sustainability

Date of Issue: August 26, 2014
Period of Validity: 5 years
(until August 26, 2019)
Declaration #: nrmca-epc-10004



Industry Wide/Average EPD

Environmental
Product
Declaration



**NRMCA MEMBER INDUSTRY-WIDE EPD FOR
READY-MIXED CONCRETE**



Table 1: Declared Product Range Classification

Specified Compressive Strength range (Column 1)	SCM range (%) (Column 2)	Product Name (Column 3)
0-2500 psi (0-17.24 MPa)	0-19% Fly Ash and/or Slag	2500-00-FA/SL
	20-29% Fly Ash	2500-20-FA
	30-39% Fly Ash	2500-30-FA
	40-49% Fly Ash	2500-40-FA
	30-39% Slag	2500-30-SL
	40-49% Slag	2500-40-SL
	≥ 50% Slag	2500-50-SL
	≥ 20% Fly Ash and ≥ 30% Slag	2500-50-FA/SL
2501-3000 psi (17.25-20.68 MPa)	0-19% Fly Ash and/or Slag	3000-00-FA/SL
	20-29% Fly Ash	3000-20-FA
	30-39% Fly Ash	3000-30-FA
	40-49% Fly Ash	3000-40-FA
	30-39% Slag	3000-30-SL
	40-49% Slag	3000-40-SL
	≥ 50% Slag	3000-50-SL
	≥ 20% Fly Ash and ≥ 30% Slag	3000-50-FA/SL
3001-4000 psi (20.69-27.58 MPa)	0-19% Fly Ash and/or Slag	4000-00-FA/SL
	20-29% Fly Ash	4000-20-FA
	30-39% Fly Ash	4000-30-FA
	40-49% Fly Ash	4000-40-FA
	30-39% Slag	4000-30-SL
	40-49% Slag	4000-40-SL
	≥ 50% Slag	4000-50-SL
	≥ 20% Fly Ash and ≥ 30% Slag	4000-50-FA/SL

Table 1: Declared Product Range Classification Cont'd

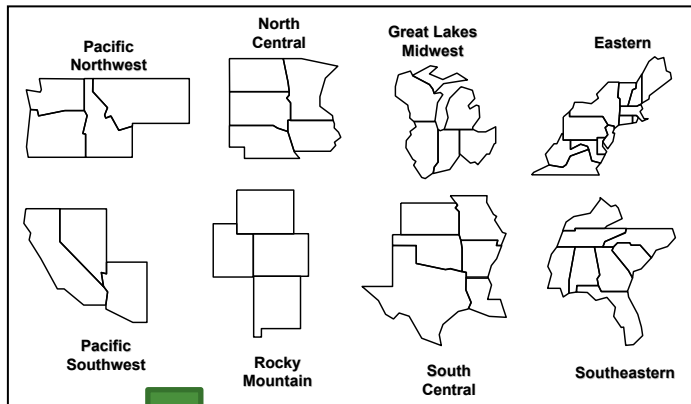
4001-5000 psi (27.59-34.47 MPa)	0-19% Fly Ash and/or Slag	5000-00-FA/SL
	20-29% Fly Ash	5000-20-FA
	30-39% Fly Ash	5000-30-FA
	40-49% Fly Ash	5000-40-FA
	30-39% Slag	5000-30-SL
	40-49% Slag	5000-40-SL
	50% Slag	5000-50-SL
	≥ 20% Fly Ash and ≥ 30% Slag	5000-50-FA/SL
5001-6000 psi (34.48-41.37 MPa)	0-19% Fly Ash and/or Slag	6000-00-FA/SL
	20-29% Fly Ash	6000-20-FA
	30-39% Fly Ash	6000-30-FA
	40-49% Fly Ash	6000-40-FA
	30-49% Slag	6000-30-SL
	40-49% Slag	6000-40-SL
	≥ 50% Slag	6000-50-SL
	≥ 20% Fly Ash and ≥ 30% Slag	6000-50-FA/SL
6001-8000 psi (41.38-55.16 MPa)	0-19% Fly Ash and/or Slag	8000-00-FA/SL
	20-29% Fly Ash	8000-20-FA
	30-39% Fly Ash	8000-30-FA
	40-49% Fly Ash	8000-40-FA
	30-49% Slag	8000-30-SL
	40-49% Slag	8000-40-SL
	≥ 50% Slag	8000-50-SL
	≥ 20% Fly Ash and ≥ 30% Slag	8000-50-FA/SL

Impacts

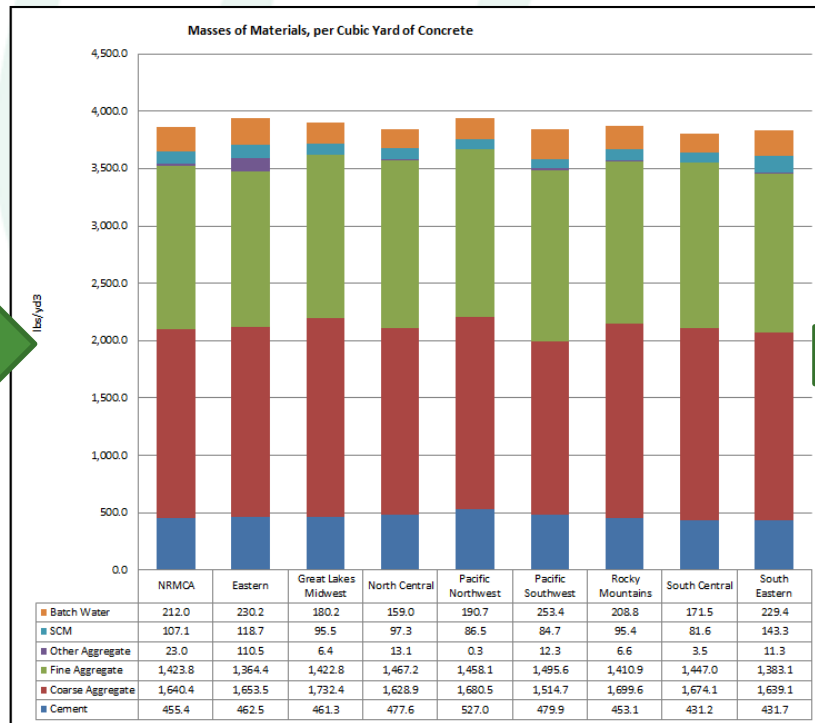
Table 8a. Summary Results (A1-A3): 3001-4000 psi (20.69-27.58 MPa) RMC product, per cubic yard

Indicator/LCI Metric	GWP	ODP	AP	EP	POCP	PEC	NRE	RE	NRM	RM	CBW	CWW	TW	CHW	CNHW
Unit (equivalent)	kg CO2	kg CFC-11	kg SO2	kg N	kg O3	MJ	MJ	MJ	kg	kg	m3	m3	m3	kg	kg
Minimum Indicator/ Metric Value	191.4	3.49E-6	1.01	0.11	13.40	1690	1676	13	1545	0.41	0.10	0.09	0.19	0.31	2.04
Maximum Indicator/ Metric Value	318.1	5.44E-6	1.39	0.15	16.91	2439	2421	17	1795	0.53	0.10	0.09	0.19	0.31	2.04
4000-00-FA/SL	318.1	5.44E-6	1.39	0.15	16.91	2439	2421	17	1795	0.53	0.10	0.09	0.19	0.31	2.04
4000-20-FA	273.0	4.68E-6	1.21	0.13	15.25	2127	2112	15	1681	0.47	0.10	0.09	0.19	0.31	2.04
4000-30-FA	248.6	4.27E-6	1.11	0.12	14.35	1959	1945	14	1620	0.44	0.10	0.09	0.19	0.31	2.04
4000-40-FA	223.0	3.84E-6	1.01	0.11	13.40	1783	1770	13	1555	0.41	0.10	0.09	0.19	0.31	2.04
4000-30-SL	242.1	4.30E-6	1.22	0.14	15.83	2021	2006	15	1665	0.48	0.10	0.09	0.19	0.31	2.04
4000-40-SL	216.8	3.93E-6	1.17	0.13	15.47	1883	1868	15	1622	0.47	0.10	0.09	0.19	0.31	2.04
4000-50-SL	191.4	3.55E-6	1.12	0.13	15.11	1745	1730	14	1578	0.46	0.10	0.09	0.19	0.31	2.04
4000-50-FA/SL	193.0	3.49E-6	1.04	0.12	14.11	1690	1676	13	1545	0.43	0.10	0.09	0.19	0.31	2.04

Industry Baselines/Averages



Average Impacts
2500 psi
3000 psi
4000 psi
5000 psi
6000 psi
8000 psi





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